



ReCAP
Research for Community Access Partnership



Development of National Business Plans for the Establishment of Road Research Units/Centres in AsCAP Member Countries

Interim Progress Report



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Cover Photo: from Asian Development Bank's Decentralized Rural Infrastructure and Livelihoods Project in Nepal

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Abstract

The Asia Community Access Partnership (AsCAP), funded by a grant from the UK Government through the Department for International Development (DFID), aims to promote safe and sustainable rural access in Asia through research and knowledge sharing between participating countries and the wider community.

Based on the outcomes of project scoping exercises undertaken in three AsCAP countries (Bangladesh, Myanmar and Nepal), the need for the establishment of road research capacity within the partner government departments was identified as a high priority in order to support and sustain research and knowledge management related to rural access.

To address the above need, AsCAP initiated a project to develop action/establishment plans supporting the needs of each country. These plans would address issues such as sustainable institutional arrangements, capacity building interventions and funding sources to support the road research centre or unit on an ongoing basis.

The Interim Progress Report presents the results of interactions held with key stakeholders in Myanmar and Bangladesh since June 2017. The objectives of these interactions were to identify the specific needs and to gain an understanding of how the individual government departments would like to establish road research management capacity within their existing institutional frameworks.

Progress on the development of business plans for the three countries is also presented. Second versions of the business plans for Bangladesh and Myanmar have been completed, as well as a first draft (discussion document) for Nepal. The project is still on target to be completed by mid-October.

Key words

Capacity Building, Knowledge Management, Research & Development, Research Unit

ASIA COMMUNITY ACCESS PARTNERSHIP (AsCAP)
Safe and sustainable transport for rural communities

AsCAP is a research programme, funded by UK Aid, with the aim of promoting safe and sustainable transport for rural communities in Asia. The AsCAP partnership supports 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. AsCAP is brought together with the Africa Community Access Partnership (AfCAP) under the Research for Community Access Partnership (ReCAP), managed by Cardno Emerging Markets (UK) Ltd.

See www.afcap.org

Acronyms

\$	United States Dollar
AASHTO	American Association of State Highway and Transportation Officials
AsCAP	Asia Community Access Partnership
ACE	Additional Chief Engineer
AE	Assistant Engineer
BIDS	Bangladesh Institute of Development Studies
BMS	Bridge Management System
BUET	Bangladesh University of Engineering and Technology
CReLIC	Climate Resilience Local Infrastructure Centre
CSIR	Council for Scientific and Industrial Research
DFID	Department for International Development
DOB	Department of Bridges
DOH	Department of Highways
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DoR	Department of Roads
DoTM	Department of Transport Management
DRD	Department of Rural Development
DRRD	Department of Rural Road Development
EE	Executive Engineer
GIS	Geographical Information System
IAB	Institute of Architects, Bangladesh
IEB	Institution of Engineers, Bangladesh
IWRM	Integrated Water Resource Management
JICA	Japan International Cooperation Agency
LGED	Local Government Engineering Department
MES	Myanmar Engineering Society
MTU	Mandalay Technological University
MOALI	Ministry of Agriculture, Livestock and Irrigation
MOBA	Ministry of Border Affairs
MOC	Ministry of Construction
MoFALD	Ministry of Federal Affairs and Local Development
MOTC	Ministry of Transport and Communications
MoU	Memorandum of Understanding
PSC	Public Service Commission
R&D	Research and Development
RDAC	Research & Development Advisory Committee
RERMP	Rural Employment and Road Maintenance Project
RHD	Roads and Highways Department
RDU	Research and Development Unit
ReCAP	Research for Community Access Partnership
RRLW	Road Research Laboratory Wing
RRRST	Rural Road Research Strategic Plan
RRRTC	Rural Road Research Technical Committee
SE	Superintending Engineer
YTU	Yangon Technological University

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1. Executive Summary

The Asia Community Access Partnership (AsCAP), funded by the UK Government through the Department for International Development (DFID), aims to promote safe and sustainable rural access in Asia through research and knowledge sharing between participating countries and the wider community.

Based on the outcomes of project scoping exercises undertaken in three AsCAP countries (Bangladesh, Myanmar and Nepal – see map below), the need for the establishment of road research capacity within the partner government departments was identified as a high priority in order to support and sustain research and knowledge management related to rural access.



To address the above need, AsCAP initiated a project in May 2017, to be completed by October 2017, to develop action/establishment plans supporting the needs of each country. These plans would address issues such as sustainable institutional arrangements, capacity building interventions and funding sources to support the road research centre or unit on an ongoing basis.

This Interim Progress Report outlines the progress that has been made since the release of the Inception Report in June 2017. It presents the results of interactions held with key stakeholders in Myanmar and Bangladesh and the progress on the development of business plans for the three countries. Second versions of the business plans for Bangladesh and Myanmar have been completed, as well as a first draft, or rather a discussion document, for Nepal.

The project is still on target to be completed by October 2017.

2. Background

The background to this project is provided in the Terms of Reference:

As part of the project scoping exercises undertaken in the three established AsCAP countries (Bangladesh, Myanmar and Nepal), in all cases the need for some form of road research capacity within the partner government departments was identified as a high priority and a major constraint to the sustainable management of research and knowledge management related to rural access.

While the detailed needs for establishment of road research capacity will be different in each country, there will be many common areas that will be relevant to all that could be undertaken as a regional AsCAP project.

This project should be seen as an establishment phase to develop detailed actions and establishments plans based on the needs of the individual countries. As part of the action plan for

establishment, sustainable institutional arrangements, capacity building interventions and funding will need to be identified to support the road research centre or unit on an ongoing basis.

The overall aim of the project is to develop detailed establishment plans, modes of operation and indicative budgets for individual AsCAP countries in line with their needs for the sustainable management of research related to rural access.

The key impacted groups will be the national government departments responsible for the provision and management of rural infrastructure in the respective AsCAP member countries.

3. Objectives

The overall objective is to support the building of indigenous road research capacity in Bangladesh, Myanmar and Nepal. The need for the establishment of sustainable road research capacity within the government departments of the three countries was identified as a high priority, also to address current constraints associated with the management of research and knowledge management related to rural access in these countries.

This objective is in line with the lessons learnt from previous DFID initiatives where the establishment of local research or research management centres has been identified as the key to local ownership and uptake of research.

In order to address this need, the establishment of a road research unit/centre in each of the three countries would be required.

The objectives of this project are to:

- (1) Identify specific needs and gain understanding of the individual countries' expectations with respect to the development of road research management capacity within their institutional frameworks;
- (2) Based on feedback obtained from (1), identify, propose and reach agreement on institutional arrangements and structures to support the entrenchment of such capacity in the three countries (i.e. establishment of rural road research units/centres);
- (3) Develop national business plan for the establishment of research capacity in line with the above outcomes, inclusive of sustainable institutional arrangements, modes of operation, capacity building interventions and funding (indicative budgets).

The project is being conducted over a 24 week period and is expected to include three visits to each country. Throughout the duration of the project the Consultant will continue to maintain close liaison with the project counterparts designated by the respective government departments in the three countries. They are:

- *Bangladesh*: Local Government Engineering Department (LGED), Ministry of Local Government, Rural Development and Cooperatives
 - *Counterpart*: Monzur Sadeque
- *Myanmar*: Department of Rural Development (DRD), Ministry of Agriculture, Livestock and Irrigation, Myanmar
 - *Counterpart (DRD)*: Mr Sou Sou Oo
- *Nepal*: Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR), Ministry of Federal Affairs and Local Development
 - *Counterpart*: Mohan Chapagain

4. Activity Progress

4.1 In-country interactions with key stakeholders

4.1.1 Myanmar

Prior to the two-week visit to Myanmar, which was took place between 20 and 30 June 2017, the Consultant prepared a preliminary draft of the Business Plan for the establishment of a Research and Development Unit (RDU) in the Department of Rural Development (DRD) under the Ministry of Agriculture, Livestock and Irrigation (MOALI). This Plan was based on the discussions held with DRD in May 2017. This draft Plan (with continuous updates effected during the visit) formed the basis of discussions held over the two-week period.

The following interactions took place between the Consultant and local stakeholders (Dr Nandar Kyaw, the AsCAP country representative, accompanied the Consultant to all meetings and visits):

- *20, 21 and 23 June:* meetings at DRD in Nay Pyi Taw with the Director of the Road & Bridge Division of DRD, Daw Tin Moe Myint, and Deputy Directors Dr Tun Myint Aung and Mr Soe Soe Oo. The Deputy Director General, Mr Myint Oo, also participated in several of these meetings.
- *27 June:* first meeting of the Rural Road Research Technical Committee (RRRTC) held at DRD. The meeting was chaired by the Director General of DRD and was attended by representatives of DRD, the Ministry of Construction (MOC), the Ministry of Transport and Communications (MOTC), the Ministry of Border Affairs (MOBA), the Department of Highways (DOH), the Yangon Technological University (YTU), the Mandalay Technological University (MTU) and the Myanmar Engineering Society (MES).
- *28 June:* visit to the MOC Training Centre (Deputy Director Pyi Phyo Sai) and Laboratories of DOH (Soe Thiha and team) and of the Department of Bridges (DOB; Hnin Hnin Soe and team) in Yangon.
- *29 June:* visit to the Civil Engineering Department and associated laboratories of YTU in Yangon (i.e. geotechnical, structures and hydraulic laboratories).

4.1.2 Bangladesh

The meetings in Bangladesh, held between 18 and 27 July 2017, were part *Inception Meetings* and part *Strategy Meetings* to inform the development of a Business Plan for the establishment of a Research and Development Unit (RDU) in the Local Government Engineering Department (LGED) under the Ministry of Local Government, Rural Development and Cooperatives.

The following interactions took place between the Consultant and local stakeholders (Executive Engineer (Planning), Abul Monzur Md. Sadeque, and/or Eng Ripon Hore of LGED accompanied the Consultant to all meetings and visits):

- *18 July:* Inception Meetings with Additional Chief Engineer (ACE) Md. Abul Kalam Azad, and with Abul Monzur Md. Sadeque; and Meeting with the Geographical Information Systems (GIS) team of LGED to understand their capabilities and identify areas requiring potential value-addition.
- *19 July:* Meeting with Dr Mamum, Director of the Bangladesh Road Research Laboratory Wing of the Roads and Highways Department (RHD); followed by visit to the LGED Central Laboratory.
- *20 July:* Meeting with a Project Director in Integrated Water Resource Management (IWRM) to discuss not only IWRM, but also road research needs; Meeting with Project Director Md.

Jasim Uddin, overseeing the implementation of the Climate Resilience Local Infrastructure Centre (CRoLIC); and Meeting with Malik Fida A Khan, Deputy Executive Director Operations, and M. Mostafa Ali, Director GIS, of the Centre for Environmental and Geographic Information Services (CEGIS), a Public Trust under the Ministry of Water Resources.

- **22 July:** Meetings with Academic Staff of the Bangladesh University of Engineering and Technology (BUET): Prof Newaz and team (*Traffic safety*), Prof Rahman (*Transport*), Prof Islam (*Geotechnics*), and senior Heads of *Planning*; and Meeting with Eng Aminur Rashid Chowdhury (Masud), the Honorary Secretariat of the Institution of Engineers Bangladesh (IEB).
- **23 July:** Meeting with Prof Abdul Jabbar Khan at the Public Service Commission (PSC), and Meeting with Superintending Engineer: Design at LGED.
- **24 July:** Major Stakeholder Meeting to discuss the RDU, which involved three Additional Chief Engineers (ACE) , several Superintending Engineers (SE), Executive Engineers (EE) and Assistant Engineers (AE) from LGED, as well as Professors from BUET; Meeting with SE: Planning and Urban Asset Management; and follow-up meeting to discuss the outcomes of the Stakeholder Meeting with ACE Md. Abul Kalam Azad.
- **25 July:** Meeting with Eng. G.P. Chowdhury, Executive Engineer Training, and visit to the LGED training/conference facilities.
- **26 July:** Meeting with Willem Gees (Home Solutions), on procedures for acceptance of non-standardised products; Meeting with Dr Mohammad Yanus of the Bangladesh Institute of Development Studies (BIDS); and Meeting with Ms. Salma Shahid, Project Director of Rural Employment and Road Maintenance Project (RERMP).
- **27 July:** Follow up meeting with Project Director Md. Jasim Uddin on CRoLIC; and Closure meeting with Abul Monzur Md. Sadeque of LGED to reach agreements on the way forward.

4.2 Main outcomes of in-country interactions with key stakeholders

The main outcomes of the in-country deliberations are captured in the second versions of the Business Plans developed for Bangladesh and Myanmar and commented on separately by the PMU and LGED. Their references are as follows:

- Verhaeghe, B. (2017a). Establishment of Rural Road Research Capacity in Bangladesh – Draft Business Plan for First Five Years of Operation. (Version 2, August 2017). AsCAP Project RAS2117A, DFID.
- Verhaeghe, B. (2017b). Establishment of Rural Road Research Capacity in Myanmar – Draft RDU Business Plan for First Five Years of Operation. (Version 2, August 2017). AsCAP Project RAS2117A, DFID.

In addition of the above, a discussion document in preparation of the Consultant’s visit to Nepal between 29 August 2017 and 8 September 2017 was prepared. Its reference is as follows:

- Verhaeghe, B. (2017c). Establishment of Local Road Research Capacity in Nepal – Draft Discussion Document. (Version 1, August 2017). AsCAP Project RAS2117A, DFID.

4.2.1 Myanmar

Most of the first week of interactions was spent on reviewing and updating the draft Business Plan that was submitted to the DRD prior to the visit. It included reaching agreement on:

- The purpose of the RDU, namely that the RDU will also conduct research themselves (i.e. not merely managing research);

- the institutional location of the RDU within the structures of the DRD¹ (see Figure 1 below), as well as the reporting structure;
- the purpose, structure and membership of the RRRTC and the Steering Committee;
- target dates for the establishment of the RDU (cf. Table 1 in Business Plan);
- five-year key performance indicators (cf. Table 2 in Business Plan), which also outline the number of projects the RDU intend to undertake as well as the staff complement of the RDU;
- the need for training of RDU researchers;
- the research infrastructure of the RDU (i.e. establishment of laboratories in two to three years' time, and to make use of the DRD Mobile Laboratory and government-approved private sector laboratories in the interim – note: it is unlikely that the RDU will make use of DOH or university laboratories);
- the importance of knowledge management and all associated aspects thereof (e.g. information centre, training, technology transfer).

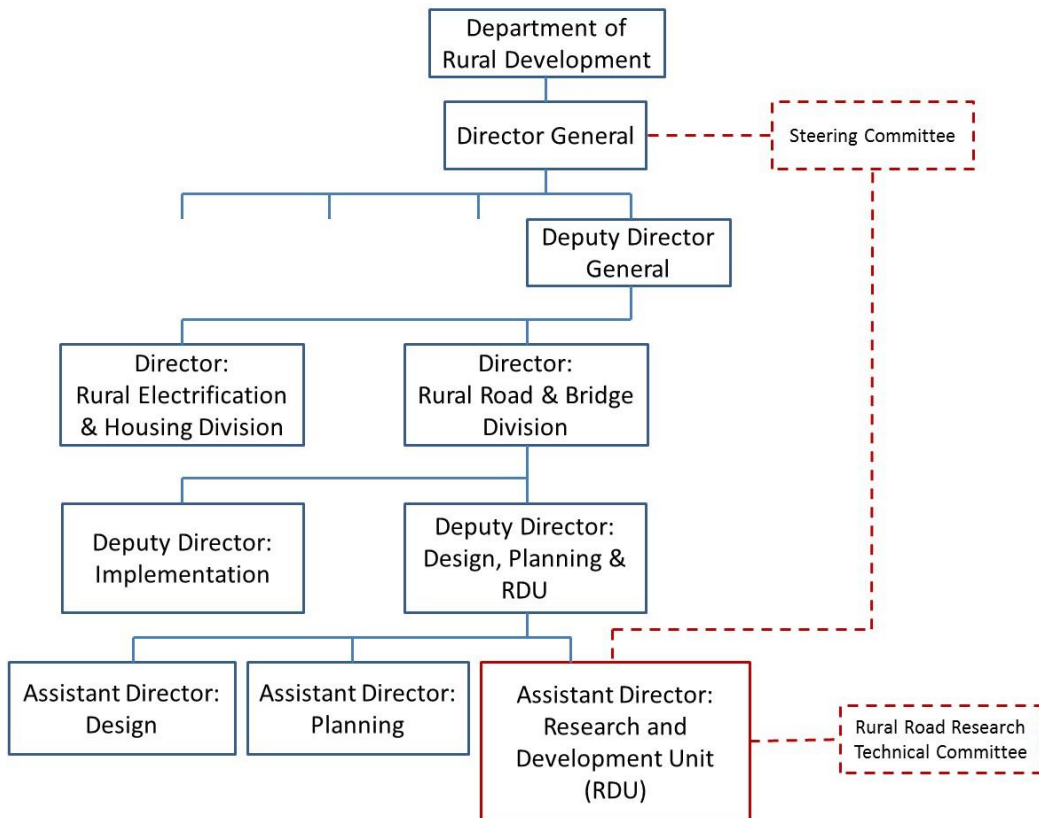


Figure 1: Institutional location of the RDU within the structures of DRD

¹ Although the DRD initially advised that the Business plan was to be framed within the existing institutional structures this was subsequently overtaken by events and by August the transfer of DRD to DRRD within MoC had taken place.

DRD expressed the urgent need to translate the Business Plan in Burmese in order for DRD and other stakeholders to comment meaningfully on the content of the Plan. Following discussions with ReCAP, it was agreed that quotations would be obtained. This has since being arranged by DRD, and the information was forwarded to the ReCAP PMU.

The first meeting of the RRRTC was held on 27 June 2017 at the offices of DRD in Nay Pyi Taw. The Consultant prepared the agenda and presentations to facilitate and steer the discussions (see Annex A). From the Consultant's perspective, the most important outcome of this meeting had to be a list of prioritised research needs that would support the development of a Rural Road Research Strategic Plan (RRRSP); inform the resources required for the establishment of the RDU (research capacity and research infrastructure); and support the drafting of an indicative budget for the RDU. This was achieved at the meeting, the outcomes of which are presented in Chapter 4 of version 2 of the RDU Business Plan. These prioritised research topics are independent of, though related to, the AsCAP funded projects.

The Consultant and Dr Nandar Kyaw travelled the evening of 27 June 2017 to Yangon to visit the laboratory facilities of the MOC (on 28 June) and YTU (on 29 June).

The **MOC** has three research laboratories, namely: (a) a *Road Research Laboratory* as part of the Research & Development Section of the DOH; (b) a *Bridge Research Laboratory* under the DOB; and (c) a *Building Research Laboratory* under the Department of Buildings.

A new facility is being planned in Yangon to house the three research facilities, to include staff accommodation, laboratories and offices.

The *Road Research Laboratory*, initially established in 1974, is responsible for (total of 74 permanent staff members):

- Research and development;
- Material testing (soil, sand, cement, aggregate, bitumen) and design of concrete, asphalt and stabilised materials with cement, lime and emulsion;
- Forensic investigations into premature failures;
- Providing lectures on material testing and design and the MOC Training School;
- Production of bitumen emulsion.

In terms of research and development, they are currently involved in three projects (bitumen-rubber asphalt, slope stabilisation and soil mapping). Their budget for the three projects is \$300,000, which accounts for human resource costs, material design/testing and the construction of trial sections.

No laboratory accreditation system has been institutionalised. Also of note is that Myanmar has moved to the adoption of AASHTO standards for testing.

The *Bridge Research Laboratory* is mainly involved in quality control, testing of structural elements and forensic investigations. They are also involved in training of young engineers (one month training course). The laboratory is very well equipped with some of the latest technologies for assessing the structural integrity of bridges in the field, and very well organised.

The following should be noted with respect to the above facilities:

- Particularly in the DOH Laboratory, equipment is either very old or recently new; at least some of equipment seems to have been donated by JICA;
- There seems to be no cooperation between the DOH and DOB Laboratories (e.g. no sharing of work load, despite the fact both Laboratories have a geotechnical capacity, for instance);
- The dedication to theoretical and practical training of young professionals is commendable, as was witnessed in the DOB Laboratory;

The Consultant was informed that **YTU** had been closed for several years on account of the political situation, but that it has initiated a mayor recapitalisation programme. This involves the establishment of a new civil engineering laboratory, fully funded by JICA. YTU is in the process of signing Memoranda of Agreements (MoU) with MOC and other ministries to ensure future cooperation, possibly also related to the new laboratory facility that will be established (no details were shared on scope of the MoUs).

Over the past five years, approximately 150 civil engineers graduated (on average, 30 graduates per year). As for the DOH Laboratories, the equipment observed in the geotechnical, structures and hydraulic laboratories was either very old or recently new, and again, at least some of equipment seemed to have been donated by JICA.

On 4 August 2017, the Consultant was informed that it has been formally announced that the Rural Road and Bridge Division of DRD will migrate to MOC to form a new department, namely the Department of Rural Road Development (DRRD). Hence, the draft business plan had to be modified to position the RDU within the new proposed structure of the DRRD, inclusive of changes to the reporting structures and staff complement. The second version of the Business Plan (Verhaeghe, 2017b) has been framed to reflect the above changes. The proposed institutional structure of the RDU within the DRRD is shown in Figure 2 below.

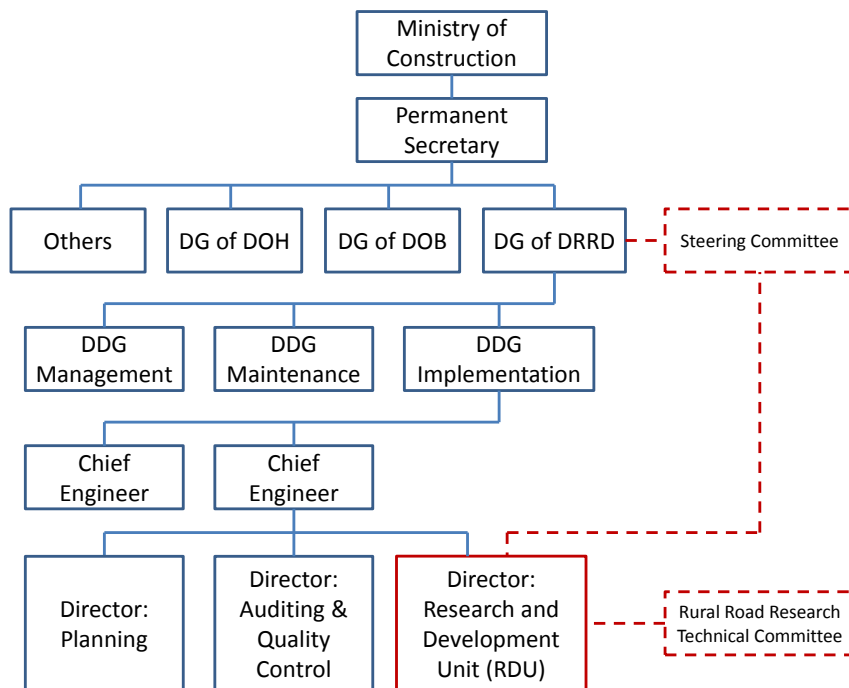


Figure 2: Institutional location of the RDU within the structures of MOC and DRRD

4.2.2 Bangladesh

The initial days of the visit (in between several meetings held within and outside LGED) were spent to fully understand the mandate, responsibilities and business of LGED, and the organisational structure of LGED. It also included a thorough study of the proposed establishment of CRELIC, and understand potential areas of conflict/synergy between the RDU and CRELIC.

From the onset, it was stated that LGED will not be involved directly in the physical execution of research and development activities (although done in pockets within LGED), but rather focus on:

- the identification and prioritisation of research needs, and the management of projects to address those, which solutions would benefit the operations of LGED, and

- the uptake and embedment of any improvements made within the organisation, as well as outside the organisation through information diffusion mechanisms (e.g. modified manuals, standards, etc, disseminated through workshops, seminars, training courses, etc.).

Hence, the primary focus of the RDU will be on the *management* of research and development, and knowledge *management*.

Significant effort was invested in three aspects related to the above, namely:

1. Identifying the rural road research needs of Bangladesh;
2. Identifying potential research and development suppliers in Bangladesh, and strategic linkages with other institutions; and
3. Identifying dissemination mechanisms.

With respect to **Item (1)**, the following list of potential research needs were identified (extract from (Verhaeghe, 2017a); presented in the box below:

Road standards, manuals, guidelines and methods:

- Climate adaptation of rural road networks (i.e. climate-resilient solutions) in association with CReLIC:
 - Standards, manuals and guidelines on resilient road infrastructure;
 - Policies and strategies for mainstreaming climate resilience in the operations of LGED;
 - Capacity building through training courses, workshops and seminars;
- Development of rural road design standards and a low-volume rural road design manual (including a review of the current catalogue design method with a view to effect improvements)²;
- Design, construction and maintenance guidelines for embankments addressing issues such as:
 - the prevention of shear failures in embankments;
 - the prevention of erosion of embankment slopes (through, for instance, bio-engineering, soil reinforcement, natural fibre geotextiles [e.g. Jute fibre] and others);
 - the prevention of ground subsidence resulting from embankments placed on soft soils;
- Slope stabilisation guidelines for rural roads to prevent road failures resulting from slope failures caused by excessive rainwater runoff and wave action (i.e. storm surges);
- Appropriate standards for labour intensive road construction and maintenance;
- Guidelines for improving compaction quality:
 - Best practices for the compaction of subgrade soils;
 - Best practices for the assessment of compaction density (e.g. correlation between sand displacement and LGED method (CBR mould) for determination of dry density);
- Guidelines for improving subsurface drainage (e.g. methods for drainage of water in plastic soils);
- Reinforced cement concrete (RCC) pavements (guidelines):
 - Methods for the repair of damaged sections of RCC subjected to different loading conditions
 - Methods for improving the interface between rigid and flexible pavements (e.g. at bridge decks)
 - Appropriate use (i.e. application) of concrete mixes with different aggregate sizes
- Methods to improve the durability of submergible roads (identification of causes and mechanisms of failure and development of sustainable solutions);
- Best practice guidelines for the maintenance of rural roads, inclusive of maintenance of road infrastructure by participatory approach (modified length man system);

² Initiated. BUET is currently undertaking part of these studies

- Guidelines for the optimum beneficiation and utilisation of local/marginal materials in rural roads (e.g. silty sands, dredged materials).
- Planning and road asset management support:**
- Study on the implications of climate change, economic growth (i.e. policy-driven actions for Bangladesh to become mid-income country by 2021) and urbanisation on transport infrastructure demand;
 - Study on the reassessment of road user costs in order to support economic feasibility studies;
 - Studies to assess the socio-economic impact of LGED interventions, as well as the drafting of protocols/ methodologies to assess socio-economic impacts to be implemented by the Monitoring and Evaluation Unit of LGED;
 - Further enhancement to LGED's GIS by development/inclusion of addition layers:
 - Traffic information (i.e. periodic monitoring of traffic volumes (type and number) on rural roads and their integration in asset management systems and GIS);
 - Soils mapping;
 - Climate data;
 - Vegetation maps (for the purpose of bio-engineering);
 - Asset management of roads and bridges:
 - Role of local stakeholders in maintenance;
 - Vehicle overloading control and prevention (also: methodology/framework for involving stakeholders in rural roads for sustainability and control of overloading;
 - Bridge Management methodology (i.e. RHD has developed a Bridge Management System (BMS) through JICA assistance – explore feasibility of adopting the BMS to manage LGED bridges).
 - Establishment of a national road material and aggregate inventory and database.

Road safety:

- Integration of road safety considerations (inclusive of geometric design considerations) into land use planning decisions and investment decisions on rural road infrastructure;
- Road safety manual and associated training modules.

With respect to **Item (2)**, the following list of potential research and development suppliers in Bangladesh, and other important stakeholders to link with, were identified (extract from (Verhaeghe, 2017a)). These are presented in the box below:

The RDU should have strong linkages with institutes that carry out research within Bangladesh.

The signing of cooperation agreements with **universities** in Bangladesh will facilitate the procurement of their services for the execution of R&D activities. These universities could include:

- Public universities:
 - the Bangladesh University of Engineering and Technology
 - the Chittagong University of Engineering and Technology
 - the Khulna University of Engineering and Technology
 - the Rajshahi University of Engineering and Technology
 - the Dhaka University of Engineering and Technology
 - the Military Institute of Science and Technology
- Private universities:
 - the University of Asia Pacific
 - the Islamic University of Technology

Such agreements may already be in place (e.g. with the Bureau of Research, Testing and Consultancy (BRTC) of BUET) but may need to be revisited to realign them with LGED's new emphasis on R&D.

Some of the research activities may be supported by post-graduate students, which will contribute to the development of these students in a work environment, but they should be led by senior academic staff of the university. Arrangements to involve LGED staff registered for post-graduate studies in RDU-led projects should also be negotiated.

In addition to universities, the RDU should be able to also engage other public and private research organisations on a needs basis (i.e. in line with the scope and activities of the RDU) such as:

- the Bangladesh Institute of Development Studies (BIDS)
- the Housing and Building Research Institute
- the Institute of Water Modelling
- the River Research Institute
- the Bangladesh Council of Scientific and Industrial Research
- the Centre for Environmental and Geographical Information Studies (CEGIS)

The RDU should also establish linkages with other players in the field of local infrastructure, such as other government entities and professional associations. For rural road and transport research, in addition to the organisations listed as potential members of the RDAC and Steering Committee, these could include:

- *The Road Research Laboratory Wing (RRLW) of the Roads and Highways Department (RHD)*
The RRLW is in the process of re-establishing research competence. This will include the establishment of a Research Council with the purpose of identifying research needs, developing an R&D programme and finalising proposals for R&D projects. Similar to the RDU, the RRLW will focus on managing R&D projects, rather than executing the projects themselves. In view of the synergies between the RDU and the RRLW, cooperation between the two entities should be encouraged. It should also be explored whether the RDU's RDAC could merge with the RRLW's proposed Research Council (when established). In the interim, it is recommended that the Director of the RRLW be invited to become a member of the RDU's RDAC.
- *The Institution of Engineers, Bangladesh (IEB)*
One of the aims and objectives of the IEB is to encourage original research in engineering and conservation and economic utilisation of the country's materials and resources. The IEB is in the process of establishing an R&D Committee to identify research needs across all disciplines of engineering, and to organise funding streams (sourced from the IEB and its members) to execute R&D projects in line with the prioritised needs. As in the case of the RRLW, the civil engineering representative of the R&D Committee should be invited to become a member of the RDU RDAC.
- *the Bangladesh Institute of Planners*
Several of BIP's objectives are associated with those of the RDU. These include:
 - to help acquire and exchange knowledge of planning among its members;
 - to encourage research in planning;
 - to foster co-ordination among the universities and colleges in Bangladesh and in other countries for mutual benefits in furthering the objectives of the Institute;
 - to disseminate among its members information on all matters relating to physical planning and to encourage, assist and extend knowledge and information connected therewith by promotion of lectures, discussion or correspondence, by holding conferences, workshops and seminars, publication of papers, periodicals and journals, proceedings, reports, books, circulars and maps or other literary undertaking by encouraging research works or by the establishment of libraries and collection of models, designs, drawings and other articles of interest in connection with physical planning;
 - to promote the cause of physical planning and integration between physical planning and socio-economic development planning in Bangladesh;

For urban infrastructure, small scale water resources and building research, in addition to the organisations listed above and as potential members of the RDAC and Steering Committee, additional government ministries and professional associations could include the following:

- the Ministry of Housing and Public Works
- the Ministry of Land
- the Ministry of Science and Technology
- the Ministry of Disaster Management and Relief
- the Rural Development and Co-operatives Division of the Ministry of Local Government, Rural Development and Co-operatives
- the Institute of Architects, Bangladesh (IAB)³.

With respect to **Item (3)**, the Consultant is of the opinion that the establishment of strong linkages between the RDU Knowledge Management group and entities internal to LGED such as the LGED Library and the LGED Training Centre will yield the necessary benefits to ensure that the outputs and outcomes of the RDU will be taken up within the organisation.

As was mentioned previously, concerns were expressed about the potential duplication of activities between the RDU and CReLIC. These are addressed in Section 4.3 of the Business Plan (Verhaeghe, 2017a). In essence, CReLIC will initially be developed in LGED and will be reporting to the Chief Engineer, but with the possibility that CReLIC might eventually become a Public Trust under the Ministry of Local Government, Rural Development and Cooperatives, or under another Ministry, similar to CEGIS referred to in Section 4.1.2.

Finally, with respect to the Business Plan, the following:

- At the stakeholder meeting held on 24 July, it was recommended that the RDU should address all research and development activities in LGED. However, after a subsequent meeting held with ACE Azad, it was agreed (in principle) that the scope of the RDU be confined at first to structured R&D support for the planning, engineering and social dimensions of *rural road and transport provision*, with the view to expand the scope to include the other local infrastructure fields (i.e. urban infrastructure, small scale water resources and buildings) in the near future after the RDU has been fully established. It was also noted that the RDU could manage R&D projects in fields other than rural roads and transport in the foundation years, but in a less structured and coordinated manner than they would do for rural road and transport R&D.
- It was agreed with Abul Monzur Md. Sadeque that LGED would propose a tentative budget for the RDU.
- It was agreed (tentatively) that the institutional positioning of the RDU (Figure 3) and the structure of the RDU (Figure 4) would be acceptable as proposed.

The second version of the Business Plan was submitted to LGED as a “discussion only” document on 7 August 2017, with feedback expected by 15 September 2017.

³ Note: up to the 19th Executive Council of the IAB (2011/12), one of the Council Members was responsible for the portfolio ‘Education and Research’. However, since the 20th Executive Council this portfolio has been reduced to ‘Education’ only.

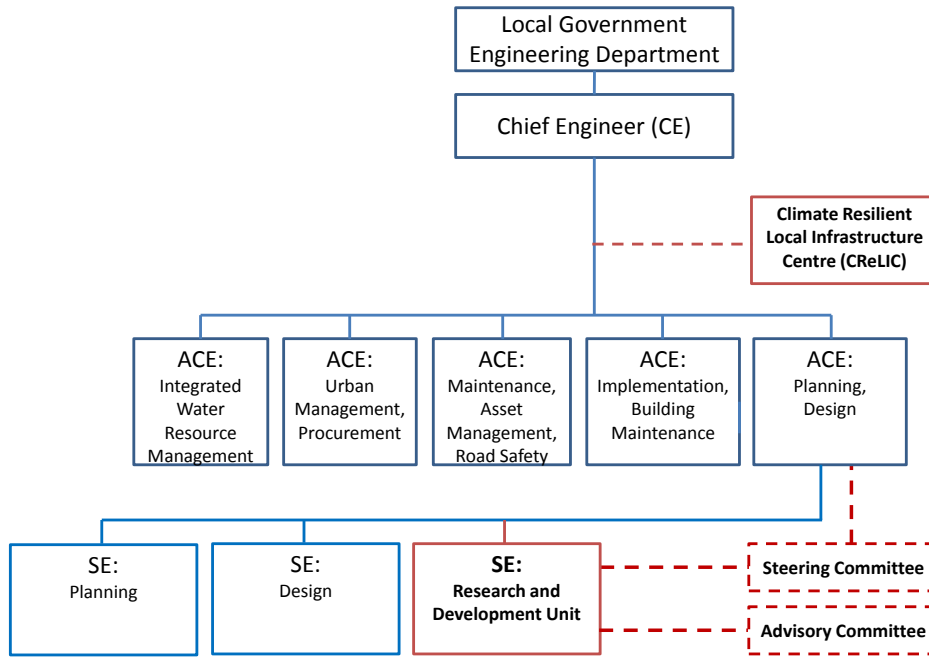


Figure 3: Proposed institutional location of the RDU (and CRILIC) within the structures of LGED

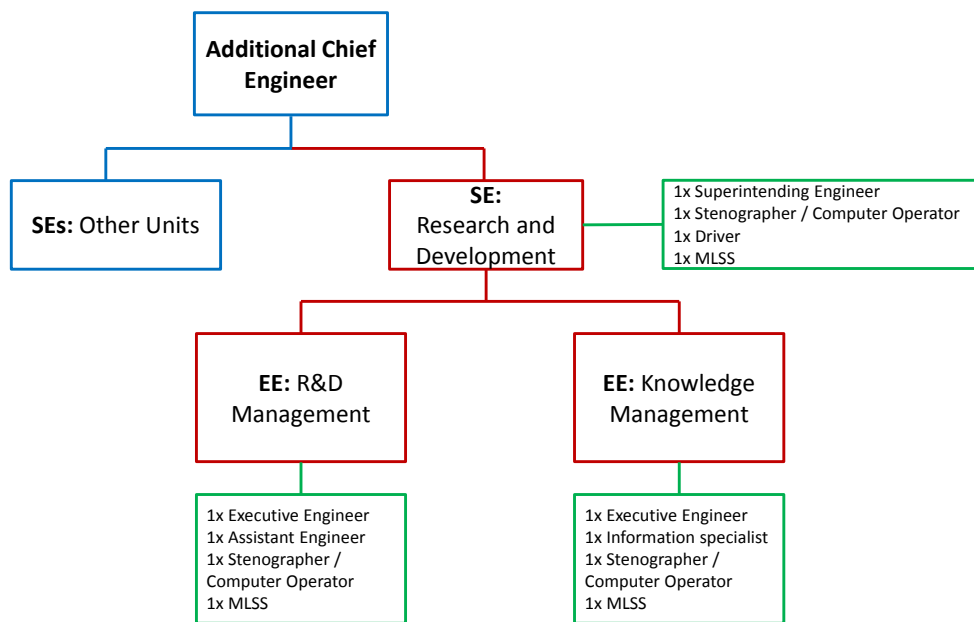


Figure 4: Proposed structure and human resources of the RDU (Year 1)

5 Deliverables

The agreed project deliverables are as follows:

- Inception Report: 26 June 2017
- Interim Progress Report: 21 August 2017
- Draft Report: 18 September 2017
- Final Report: 16 October 2017

The Final Report will also provide recommendations on any further ReCAP/AsCAP support and/or possible support from other stakeholders (including other donor support) required in the short to medium term.

In addition to the above, interim Business Plans for the establishment of research capacity in the three countries will be circulated to ReCAP for their approval before being submitted to the countries.

6. Activity Schedule


The Activity Schedule (Gantt chart) is shown below. It should be noted that the schedule might have to be adjusted to accommodate circumstances beyond the control of the Consultant (i.e. Stakeholder requests to accelerate the process or to postpone visits).

The plan is to still complete the project by the contractual due date of 16 October 2017.

	May	June	July	August	September	October
ACTIVITIES						
Inception meetings						
- Myanmar and Nepal		■				
- Bangladesh			■			
Two-week in-country activities						
- Myanmar		■				
- Bangladesh			■			
- Nepal				■		
Presentation of Final Business Plan						
- Myanmar					■	
- Bangladesh					■	■
- Nepal						■
OUTPUTS						
Inception Report (Myanmar & Nepal)			■			
1st Draft Business Plan						
- Myanmar		■				
- Bangladesh			■			
- Nepal				■		
Interim Progress Report						
2nd Draft Business Plan						
- Myanmar				■		
- Bangladesh				■		
- Nepal					■	
Draft Final Business Plans and Draft Report						
Final Business Plans and Final Report						■

- In-country activities
- Milestone Reports
- Draft and Final Business Plans

Annex A: Presentation made to the RRRTC of DRD (27 June 2017)



Implementation Plan for the Research and Development Unit

Rural Road Research Technical Committee (RRRTC)
DRD Offices, Nay Pyi Taw
27 June 2017

Outline

- Vision, Mission and Strategic Objectives
- Institutional location
- Key Performance Indicators and targets

Research and Development Unit (RDU)

- **Vision:**
 - To provide scientific, engineering and technological leadership to effect sustainable improvements in the quality and effectiveness of rural access in support of socio-economic development imperatives and the attainment of the Myanmar's Sustainable Development Goals
- **Mission:**
 - Through research, development, implementation of research outcomes and capacity building, to enhance rural connectivity and to ensure transportation of people, goods and services in a safe, economic and sustainable manner, contributing to economic, social and cultural development in Myanmar












Strategic Objectives







- The RDU will serve the rural road engineering and transport needs of Myanmar through:
 - the development, application and dissemination of best practices and new knowledge
 - the development of human capital.
- The RDU will strive to provide practical, innovative, cost-effective research and development based solutions that:
 - address the current and future rural road and transport needs of the country
 - support sustainable development and asset preservation
 - enhance socio-economic impact.

Institutional Location





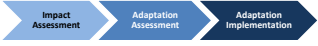
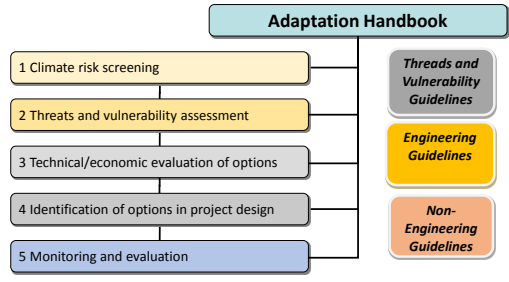





Critical Success Factors	Key Performance Indicators	Targets				
		Year 1	Year 2	Year 3	Year 4	Year 5
R&D portfolio efficiency and effectiveness	No. of RRRTC meetings held	3	2	2	2	2
	Compliance with RRRTC directives	100%	100%	100%	100%	100%
	No. of research projects in active development	2	4	6	8	12
	No. of projects secured with private sector funding	0	0	1	2	4
	No. of projects secured with Development Partners contribution	1	2	3	4	6
	No. of projects successfully completed	1	2	4	6	9
	% Milestones met (i.e. % R&D objective achievements)	100%	100%	100%	100%	100%
	Released vs. planned deliverables (%)	100%	100%	100%	100%	100%
	Portfolio yearly spending against budget (%)	Report	Report	Report	Report	Report
	Cost savings attributable to R&D	Report	Report	Report	Report	Report
Stakeholder satisfaction with research outcomes	70%	70%	75%	80%	85%	
Ensuring effective transfer of technology to practice	No. of conference papers presented	1	2	3	5	7
	No. of journal articles published	0	1	2	3	3
	No. of industry workshops held	2	4	6	8	8
	No. of industry guidelines and manuals published	0	1	2	2	3
	No. of norms and standards published	0	1	1	2	3
Strengthening the skills base of the RDU	No. of demonstration projects successfully completed	1	2	2	3	4
	No. of Doctorates	1	1	1	2	2
	No. of Masters	1	1	3	3	4
	No. of staff classified as researchers	4	4	6	8	10
	No. of technical staff (laboratory/field testing)	1	2	4	7	7
	No. of staff studying towards a PhD	1	1	1	1	2
	No. of staff studying towards a Masters	2	2	3	3	4
	No. of staff inducted at international R&D centres	1	1	1	1	1
	Average % time spent by research staff on R&D projects	60%	60%	65%	65%	70%
	Average % time spent on administration/management	20%	20%	15%	15%	15%
Average % time spent on capacity building	15%	10%	10%	10%	5%	
Average % time spent on industry events (e.g. workshops)	5%	10%	10%	10%	10%	
Ensuring good governance	No. of Steering Committee meetings held	2	2	2	2	2
	Compliance with Steering Committee directives	100%	100%	100%	100%	100%
	Adherence to standards of good corporate governance	100%	100%	100%	100%	100%
	ISO 9000 quality system implementation	initiate	initiate	comply	comply	comply
	Adherence to health, safety and environment standards	100%	100%	100%	100%	100%
	Collaboration with universities: No. of projects with universities	0	1	2	3	3






<p style="text-align: center;">Questions</p>  	<p style="text-align: center;"> Role and Responsibilities of the RRRTC Rural Road Research Technical Committee (RRRTC) DRD Offices, Nay Pyi Taw 27 June 2017</p>
<p style="text-align: center;">Points of Discussion</p> <ul style="list-style-type: none"> • Agreement on Terms of Reference of RRRTC, and relationship between RRRTC and Steering Committee • Membership of the RRRTC • Chairperson of the RRRTC • Frequency of RRRTC meetings  	<p style="text-align: center;">Terms of Reference for the RRRTC</p>  
<p style="text-align: center;">Purpose of the RRRTC</p> <ul style="list-style-type: none"> • Provide technical guidance and direction to the Research and Development Unit (RDU) • Advise the Steering Committee on nature and scope of research and development activities that will be or are being undertaken in the road infrastructure engineering domain • Seek endorsement from Steering Committee for implementation of the Rural Road Research Strategic Plan  	<p style="text-align: center;">Role and Responsibilities (RRRTC)</p> <ul style="list-style-type: none"> • To advise on research and development (R&D) needs and priorities • To assist with technology foresight studies • To advise on strategic plans and research portfolio plans for the R&D programme • To assist in the review of research proposals in line with the strategy • To assist in the review of outputs and outcomes of R&D projects • To assist in assessing the impact of R&D activities  

<p style="text-align: center;">Role & Responsibilities (Steering Committee)</p> <ul style="list-style-type: none"> • Steer establishment and operations of the RDU and assess the adoption of ‘good governance’ principles • Endorsement of priority research and development projects recommended by the RRRTC and identify and/or endorse allocation of funding to projects • Support appointment of project leaders and teams • Provide overarching project management and output quality reviews • Monitor effective technology transfer and implementation of outcomes 	<p style="text-align: center;">Membership of the RRRTC</p> 
<p style="text-align: center;">Membership of the RRRTC</p> <ul style="list-style-type: none"> • DRD under MOALI • DOH and DOB under MOC • MOBA • MOTC • Universities (MTU, YTU, etc.) • Myanmar Engineering Society (MES) • Development Partners (as observers) • Others? 	<p style="text-align: center;">Membership of Steering Committee</p> <ul style="list-style-type: none"> • DRD under MOALI • MOBA • DOH and DOB under MOC • RTAD under MOTC • Development Partners (as observers) 
<p style="text-align: center;">Chairperson of the RRRTC</p> 	<p style="text-align: center;">Chairperson of the RRRTC</p> <ul style="list-style-type: none"> • Proposal: <ul style="list-style-type: none"> – Interim: Daw Tin Moe Myint – After RDU establishment: Head of the RDU 








<div style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h2>Frequency of RRRTC Meetings</h2> </div> <div> </div> <div> </div>	<div style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h2>Frequency of Meetings</h2> </div> <ul style="list-style-type: none"> • Proposal: <ul style="list-style-type: none"> – First year (establishment phase): 3 meetings/year – Subsequent years: 2 meetings/year <div> </div> <div> </div>
<div style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h2>Discussion</h2> </div> <div> </div> <div> </div>	<div style="text-align: center;"> </div> <div style="text-align: center;"> <h2>Identification and Prioritisation of Research Needs</h2> </div> <div style="text-align: center;"> <p>Rural Road Research Technical Committee (RRRTC)</p> </div> <div style="text-align: center;"> <p>DRD Offices, Nay Pyi Taw 27 June 2017</p> </div>
<div style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h2>Outline</h2> </div> <ul style="list-style-type: none"> • Overview of past and present research undertaken • Identification of research needs • Prioritisation of research needs <div> </div> <div> </div>	<div style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h2>Past and present rural road research</h2> </div> <ul style="list-style-type: none"> • Importance of past research records: <ul style="list-style-type: none"> – Enables RDU to build on previous work – Prevents duplication of research efforts • Status of past research: <ul style="list-style-type: none"> – No records, except for UN funded road-related R&D in 1987? – Past research mostly conducted at universities linked to post-graduate studies? – Are records available of completed PhD/MEng theses? <div> </div> <div> </div>




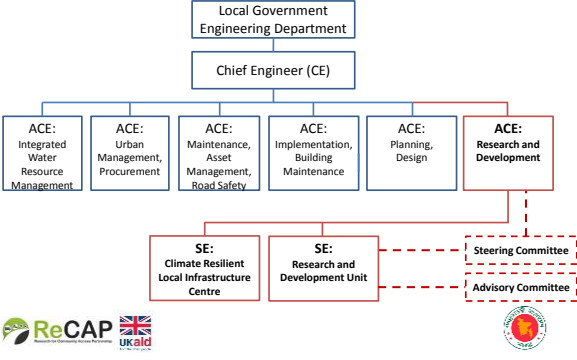

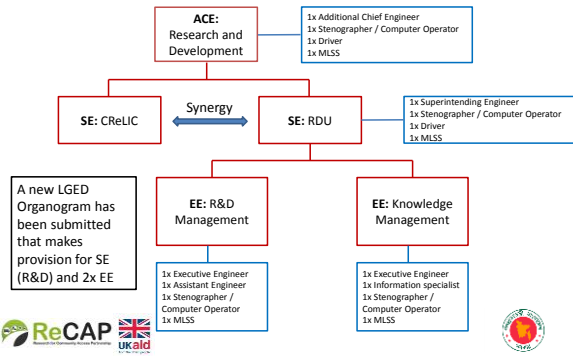


<p style="text-align: center;">Past and present rural road research</p> <ul style="list-style-type: none"> • Current research: <ul style="list-style-type: none"> – Rural Development Programme in Southern Shan State, including: <ul style="list-style-type: none"> • Trials of road technology alternatives • Development of rural road maintenance management systems • Formal and hands-on training (including study tours) <p><i>Funded by KfW</i></p> <p style="text-align: center;">     </p>	<p style="text-align: center;">Past and present rural road research</p> <ul style="list-style-type: none"> • Current research (new): <ul style="list-style-type: none"> – Rural road and bridge standards (Phase 1) <ul style="list-style-type: none"> • Develop a comprehensive set of standards for rural roads and bridges <ul style="list-style-type: none"> – Building on existing standards and ensure alignment with other standards in use in Myanmar (MOALI, MOBA, MOC) – Incorporate learning from other programmes funded by KfW, ADB and World Bank (inclusive of trial sections) – Development of a low-volume rural road design manual (Phase 2) <p><i>Funded by DFID (Phase 1 to be initiated in July 2017)</i></p> <p style="text-align: center;">     </p>
<p style="text-align: center;">Potential research needs</p> <p>(1) Rural road and bridge inventory and database</p> <ul style="list-style-type: none"> – Cooperation with current and new programmes funded by KfW, ADB and World Bank – Develop a rural road inventory database <ul style="list-style-type: none"> • Link to road survey forms • Complete existing inventory data • Enter data into a database and GIS – Include data on village access (including villages that are not connected) – Make data available remotely – Use of simple software/hardware <p style="text-align: center;">     </p>	<p style="text-align: center;">Potential research needs</p> <p>(2) Road selection and prioritisation</p> <ul style="list-style-type: none"> – Cooperation with new programme (“Rural Access program”) funded by ADB – Identify core rural road network <ul style="list-style-type: none"> • Identify existing rural roads • Select priority core rural roads (one road connecting each village) • Identify needs for connecting remaining villages – Determine costs of required interventions – Make data available remotely – Prioritise interventions <p style="text-align: center;">     </p>
<p style="text-align: center;">Potential research needs</p> <p>(3) Road protection measures</p> <ul style="list-style-type: none"> – Aim is to identify suitable low-cost measures to improve <u>drainage</u> and <u>slope protection</u> in rural roads <ul style="list-style-type: none"> • Identify appropriate measures • Technical standards • Model designs – Possible study tour to other countries – Trialing of specific measures and long-term monitoring of performance <p><i>Possibility for DFID co-funding</i></p> <p style="text-align: center;">     </p>	<p style="text-align: center;">Potential research needs</p> <p>(4) Complimentary access infrastructure</p> <ul style="list-style-type: none"> – Low cost extension of road access benefits <ul style="list-style-type: none"> • Footpaths, footbridges and other basic infrastructure • Use by pedestrians and motorcycles to access road network • Will generate high impact at low cost – Expand experience in Chin State to other States/Regions as appropriate – Develop appropriate technical standards and model designs – Could include exchange visits to observe similar infrastructure and programmes <p><i>Possibility for DFID funding</i></p> <p style="text-align: center;">     </p>



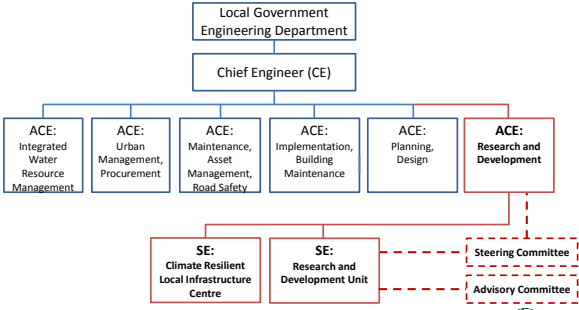




<p style="text-align: center;">Potential research needs</p> <p>(5) Climate adaptation of rural road networks</p> <ul style="list-style-type: none"> – Climate vulnerability assessments – Guidelines for engineering adaptation measures <ul style="list-style-type: none"> • Climate resilient roads • Drainage systems • Slope stability • Structures (bridges) – Guidelines for non-engineering adaptation measures <ul style="list-style-type: none"> • Policies, strategies, norms and standards • Capacity building • Integration in asset management <p><i>Possibility for DFID funding as a regional ReCAP project</i></p> 	<div style="text-align: right; margin-bottom: 10px;">  </div> <p style="text-align: center;">Adaptation Handbook</p>  
<p style="text-align: center;">Potential research needs</p> <p>(6) Road surfacing trials</p> <ul style="list-style-type: none"> – KfW established trials in flat terrain near Taunggyi <ul style="list-style-type: none"> • Penetration macadam (control); double bituminous surface treatment; concrete blocks; non-reinforced concrete – Expand trials: <ul style="list-style-type: none"> • Include unsealed road surfaces • Include trials in hilly terrain, dry zone and delta zone <p><i>Construction of new trials could be integrated in World Bank and ADB programmes</i></p> <p><i>Possibility for DFID funding for technical assistance for establishment and performance monitoring</i></p> 	<p style="text-align: center;">Potential research needs</p> <ul style="list-style-type: none"> • Other potential needs: <ol style="list-style-type: none"> (7) Effects of traffic loading (inclusive of vehicle overloading) on the performance of rural roads (8) Geometric design guidelines for rural roads (9) National road material and aggregate inventory and database (10) Guidelines for the optimum utilisation of marginal materials in rural roads 
<p style="text-align: center;">Potential research needs</p> <ul style="list-style-type: none"> • Other potential needs: <ol style="list-style-type: none"> (11) Survey of factors that impact on quality of construction and maintenance of rural roads (also through forensic investigations) (12) Improvement of test procedures for monitoring and controlling quality in construction (13) Best practice guidelines for the maintenance of rural roads 	<p style="text-align: center;">Potential research needs</p> <ul style="list-style-type: none"> • Other potential needs: <ol style="list-style-type: none"> (14) Enhancement of the safety quality of new and existing rural roads and roadsides, through the adoption of improved design, construction, assessment and treatment practices (including retrofitting of safety features) (15) Integration of road safety considerations into land use planning decisions and investment decisions on road infrastructure <p><i>(based on recommendations of an expert mission invited by the Government of Myanmar, April 2017)</i></p> 











<p style="text-align: center;">Potential research needs</p> <ul style="list-style-type: none"> • Others? 	<p style="text-align: center;">Prioritisation of Research Needs</p> 
<p style="text-align: center;"></p> <p style="text-align: center;">Way Forward</p> <p style="text-align: center;">Rural Road Research Technical Committee (RRRTC)</p> <p style="text-align: center;">DRD Offices, Nay Pyi Taw 27 June 2017</p> 	<p style="text-align: center;">Way Forward</p> <ul style="list-style-type: none"> • Preliminary draft of the RDU Business Plan has been completed • Actions: <ul style="list-style-type: none"> – Consolidate feedback from the RRRTC – Draft 1st version of the Rural Road Research Strategic Plan (RRRSP) <ul style="list-style-type: none"> • Adjust manpower and budgets in RDU Business Plan in line with RRRSP • Produce 2nd draft of RDU Business Plan by mid-July – Circulate draft RRRSP to members of the RRRTC for comments (by mid-July) – Receive comments from RRRTC members (by mid-August) – Produce final draft of RRRSP (and Business Plan) by early-September and circulate to members of the RRRTC – Hold 2nd meeting of the RRRTC to approve RRRSP, and meeting of the Steering Committee to endorse both Plans (mid/late September) 



















Annex B: Presentation made to LGED (Bangladesh) on 24 July 2017











 <p style="text-align: center;">Business Plan for the Research and Development Unit</p> <p style="text-align: center;">Stakeholder Meeting LGED Headquarters, Dhaka 24 July 2017</p>	<div style="background-color: #e0e0e0; padding: 5px; text-align: center;">Outline</div> <ul style="list-style-type: none"> • Background • Vision, Mission and Strategic Objectives • Institutional location • Sources of funding • Role of Advisory and Steering Committees • Key Performance Indicators and targets • Strategic relationships and linkages • Identified R&D needs • Way forward  
<div style="background-color: #e0e0e0; padding: 5px; text-align: center;">Background</div> <ul style="list-style-type: none"> • ReCAP Scoping Study: <ul style="list-style-type: none"> – Need for some form of road research capacity within the partner government departments of Bangladesh, Nepal and Myanmar was identified as a high priority • Phase 1 should be seen as an establishment phase to develop detailed actions and establishment plans based on the needs of the individual countries  	<div style="background-color: #e0e0e0; padding: 5px; text-align: center;">Organisations consulted</div> <ul style="list-style-type: none"> • LGED • Road Research Laboratory of RHD • CEGIS • BUET • IEB • PSC (Prof Abdul Jabbar Khan)  
<div style="background-color: #e0e0e0; padding: 5px; text-align: center;">Vision, Mission and Strategic Objectives</div>	<div style="background-color: #e0e0e0; padding: 5px; text-align: center;">Research and Development Unit (RDU)</div> <p>Vision: To provide scientific, engineering and technological leadership to support the continued strengthening of LGED's professional competence as an efficient and effective public sector agency for performing the interrelated and complementary functions of:</p> <ul style="list-style-type: none"> • Developing, maintaining and managing transport infrastructure at the local level by ensuring LGI and community participation and taking care of environmental and social issues; • Providing technical and institutional support to strengthen the local government institutions and serving local communities and other stakeholders. <p>Mission: Through research, development, implementation of research outcomes and capacity building, to enhance the development and management of local road infrastructure for increasing farm/non-farm productivity, generating employment, improving socio-economic conditions, promoting local governance, reducing poverty and acting as agent of change at the local level.</p>  

<h3 style="text-align: center;">Strategic Objectives</h3> <ul style="list-style-type: none"> The RDU will serve the rural road engineering and transport needs of Bangladesh through: <ul style="list-style-type: none"> the development, application and dissemination of best practices and new knowledge the development of human capital. The RDU will strive to provide practical, innovative, cost-effective research and development based solutions that: <ul style="list-style-type: none"> address the current and future rural road and transport needs of the country support sustainable development and asset preservation enhance socio-economic impact. 	<h3 style="text-align: center;">Value proposition</h3> <ul style="list-style-type: none"> The RDU will add value to LGED through the provision of: <ul style="list-style-type: none"> a proficiently managed and coordinated portfolio of R&D projects, executed in accordance with the engineering and technological priorities endorsed by LGED knowledge management to coordinate efficient and effective uptake and embedment of the outcomes of all R&D activities and to provide access to and diffusion of information to all stakeholders overall technological leadership for developing solutions and products that will address rural road and transport-related problems that impact on the national priorities of Bangladesh 
<h3 style="text-align: center;">Institutional Location</h3> 	<h3 style="text-align: center;">Institutional Location</h3>  
<h3 style="text-align: center;">RDU organogram</h3>  	<h3 style="text-align: center;">Sources of funding</h3> 

<h3 style="text-align: center;">Sources of funding</h3> <ul style="list-style-type: none"> • RDU should have long-term guaranteed funding (for at least 5 years) • Status: <ul style="list-style-type: none"> – 1 million BDT has been allocated from the revenue budget for <i>Research and Innovation</i> – Other funding sources: <ul style="list-style-type: none"> • GOB project funding (Proposed) • Donor funding (e.g. DFID, IFAD) 	<h3 style="text-align: center;">Role of Advisory and Steering Committees</h3> 
<h3 style="text-align: center;">Institutional Location</h3>  	<h3 style="text-align: center;">Purpose of the RDAC</h3> <ul style="list-style-type: none"> • Provide technical guidance and direction to the Research and Development Unit (RDU) • Advise the Steering Committee on nature and scope of research and development activities that will be or are being undertaken in the road infrastructure engineering domain • Seek endorsement from Steering Committee for implementation of the Rural Road Research Strategic Plan <p style="text-align: center;"><i>RDAC: Research & Development Advisory Committee</i></p> 
<h3 style="text-align: center;">Role and Responsibilities (RDAC)</h3> <ul style="list-style-type: none"> • To advise on R&D needs and priorities • To assist with technology foresight studies • To advise on strategic plans and research portfolio plans for the R&D programme • To assist in the review of research proposals in line with the strategy • To assist in the review of outputs and outcomes of R&D projects • To assist in assessing the impact of R&D activities 	<h3 style="text-align: center;">Proposed Membership (RDAC)</h3> <ul style="list-style-type: none"> • Technical experts from: <ul style="list-style-type: none"> – Local Government Division – Local Government Engineering Department (Unit representatives / Project Directors) – Roads and Highways Department – Director of the Road Research Laboratory Wing of RHD – Ministry of Water Resources – Universities – Institution of Engineers, Bangladesh – Development Partners (as observers) 

<h3 style="text-align: center;">Role & Responsibilities (Steering Committee)</h3> <ul style="list-style-type: none"> Steer establishment and operations of the RDU and assess the adoption of 'good governance' principles Endorsement of priority research and development projects recommended by the RDAC and identify and/or endorse allocation of funding to projects Support appointment of project leaders and teams Provide overarching project management and output quality reviews Monitor effective technology transfer and implementation of outcomes  	<h3 style="text-align: center;">Proposed Membership (Steering Committee)</h3> <ul style="list-style-type: none"> Senior representatives of: <ul style="list-style-type: none"> LGD LGED RHD the Ministry of Water Resources Directorate Climate Change and International Convention of the Department of Environment Development Partners (witness procedures) Others?  																																																																																																																																																																																																																																																					
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	Average % time spent on capacity building (external - e.g. workshops)	10%				25%																																																																																																																																																																																																																																																
	No. of Steering Committee meetings held	2	2	2	2	2																																																																																																																																																																																																																																																
	Compliance with Steering Committee directives	100%	100%	100%	100%	100%																																																																																																																																																																																																																																																
	Adherence to standards of good corporate governance	100%	100%	100%	100%	100%																																																																																																																																																																																																																																																
	Adherence to health, safety and environment standards	100%	100%	100%	100%	100%																																																																																																																																																																																																																																																
	R&D collaboration - No. of MoUs signed	2	4	4	6	6																																																																																																																																																																																																																																																

<h3 style="text-align: center;">Strategic Relationships/Linkages</h3> <ul style="list-style-type: none"> • Within Bangladesh <ul style="list-style-type: none"> – R&D suppliers (signing of cooperative agreements): <ul style="list-style-type: none"> • Bangladesh University of Engineering and Technology (BUET) • Chittagong University of Engineering and Technology (CUET) • Khulna University of Engineering and Technology (KUET) • Rajshahi University of Engineering and Technology (RUET) • Dhaka University of Engineering and Technology (DUET) – Linkages with other stakeholders (membership of RDAC): <ul style="list-style-type: none"> • RRLW of RHD (Research Council) • IEB (R&D Committee)   	<h3 style="text-align: center;">Strategic Relationships/Linkages</h3> <ul style="list-style-type: none"> • International: <ul style="list-style-type: none"> – Regional R&D Units/Centres (cooperation): <ul style="list-style-type: none"> • IRRI of CSIR (India) • Local Transport Research Unit in DoLIDAR (Nepal) • R&D Unit in DRD (Myanmar) – Others (examples): <ul style="list-style-type: none"> • ARRB (Australia) • TRL (UK) • CSIR (South Africa)   
<h3 style="text-align: center;">Identified R&D Needs</h3>   	<h3 style="text-align: center;">Identified R&D needs (1)</h3> <ul style="list-style-type: none"> • Rural road design standards (ongoing project) and development of a low-volume rural road design manual (including a review of the catalogue design method) • Design, construction and maintenance guidelines for embankments, addressing aspects such as: <ul style="list-style-type: none"> – the prevention of shear failures in embankments – the prevention of erosion of embankment slopes (bio-engineering, soil reinforcement, natural fibre geotextiles) – the prevention of ground subsidence (embankments placed on soft soils) • Climate adaptation of rural road networks (i.e. climate-resilient solutions)   
<h3 style="text-align: center;">Identified R&D needs (2)</h3> <ul style="list-style-type: none"> • Appropriate standards for labour intensive road construction and maintenance • Guidelines for improving compaction quality: <ul style="list-style-type: none"> – Best practices for compaction of subgrade soils – Correlation between sand displacement and LGED method (CBR mould) for determination of dry density • Best practice guidelines for the maintenance of rural roads • National road material and aggregate inventory and database • Guidelines for the optimum beneficiation and utilisation of local/marginal materials in rural roads (incl. silty sands, dredged materials)   	<h3 style="text-align: center;">Identified R&D needs (3)</h3> <ul style="list-style-type: none"> • Study on the implications of climate change, economic growth (i.e. policy driven actions to become mid-income country by 2021) and urbanisation on transport infrastructure demand • Integration of road safety considerations into land use planning decisions and investment decisions on rural road infrastructure • Road safety manual and associated training modules   

<h3 style="text-align: center;">Identified R&D needs (4)</h3> <ul style="list-style-type: none"> • Guidelines for the periodic monitoring of traffic volumes (type and number) on rural roads and their integration in asset management systems and GIS • Further enhancement to LGED's GIS by development/inclusion of addition layers: <ul style="list-style-type: none"> – Traffic information (volume by type) – Soils mapping – Climate data  	<h3 style="text-align: center;">Identified R&D needs (5)</h3> <ul style="list-style-type: none"> • Road & Structures Asset Management <ul style="list-style-type: none"> – Role of local stakeholders in maintenance – Vehicle overloading control and prevention – Bridge management methodology (RHD has developed a BMS with JICA assistance)  
<h3 style="text-align: center;">Identified R&D needs (6)</h3> <ul style="list-style-type: none"> • Needs linked to establishment of the RDU <ul style="list-style-type: none"> – Development of an output database of past and current research projects undertaken in Bangladesh, inclusive of relevant university outputs (Masters and PhD dissertations, research reports), as well as donor and LGED funded research outputs – Establishment of a construction training centre for technical staff of LGED – Development of protocols for the establishment, monitoring and management of demonstration projects  	<h2 style="text-align: center;">Way Forward</h2>  
<h3 style="text-align: center;">Way Forward</h3> <ul style="list-style-type: none"> • Preliminary draft of the RDU Business Plan has been completed and submitted to LGED • Actions: <ul style="list-style-type: none"> – Consolidate feedback from Stakeholder Meeting and engage with other stakeholders (this week) – Prepare and submit a 2nd draft by mid-August – Receive feedback by end-August – Produce and submit final draft by mid-September – Engage with LGED during first week of October to finalise the Plan and submit/present to Steering Committee for approval on 5 October 2017  	<h2 style="text-align: center;">Thank you</h2> <p style="text-align: center;">For more information, please contact: Benoit Verhaeghe bverhaeg@csir.co.za +27 82 894 2206</p> 