LGED
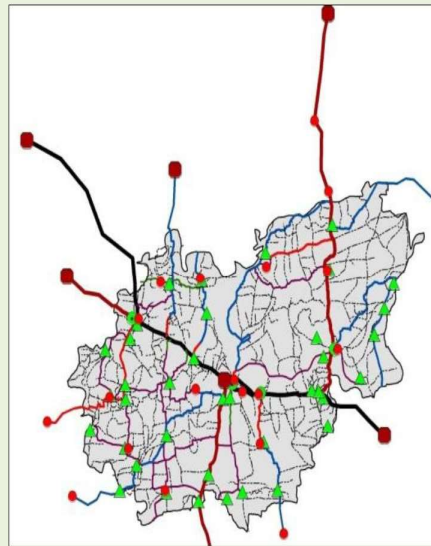
Planning and Prioritisation of Rural Roads in Bangladesh

Report of the Training of Trainers (ToT)

Department of Urban and Regional Planning (URP)
Bangladesh University of Engineering and Technology (BUET)

February 2018 (Revised)

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) or the Local Government Engineering Department (LGED).

Cover Photo:

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

Quality assurance and review table			
Version	Author(s)	Reviewer(s)	Date
1	Department URP, BUET	Les Sampson, Maysam Abedin and Nkululeko Leta, ReCAP	February 05, 2018
2	Department URP, BUET	Maysam Abedin, ReCAP	February 22, 2018
3	Department URP, BUET	Maysam Abedin, ReCAP	February 27, 2018

Key words

Rural Road, Bangladesh, Prioritisation, Multi Criteria Analysis, Cost Benefit Analysis, Vehicle Operating Cost Savings, Travel Time Savings, Annual Average Daily Traffic

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

Acknowledgements

Acronyms

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 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
RHD	Roads and Highways Department
SFYP	Seventh Five Year Plan
TTCS	Travel Time Cost Saving
URP	Urban and Regional Planning
VOCS	Vehicle Operating Cost Saving

Contents

1   Executive Summary

The Department of Urban and Regional Planning of Bangladesh University of Engineering and Technology (BUET) in collaboration with LGED, has implemented a project to develop an appropriate planning and prioritisation model for the rural roads in Bangladesh. A two-day Training of the Trainers (ToT) programme on Rural Road Planning and Prioritisation Model (RPPM) was organised on January 20-21, 2018 as an output of the project. The programme was jointly organised by the Department of Urban and Regional Planning in association with the LGED. The purpose of ToT was to train LGED professionals as trainers to facilitate on-going uptake of the Rural Road Planning and Prioritisation Model (RPPM). It is expected that the RPPM tool can be implemented in other districts of Bangladesh with the help of the trained officials.

The training programme was attended by 18 LGED officials, including two female participants, from the Head Quarters and field-level offices in Tangail. The deliberations and active participation of the trainees at the training programme provided valuable insights. Discussion between the trainees and trainers were very effective to identify the issues critical to the application of RPPM in other districts of Bangladesh. The training programme was effective to draw conclusion on different aspects of the methodology used in RPPM. Regarding the best use of the tool by LGED, some suggestions were also made by the participants to clarify matters related to input of additional data in the road database.

2   Introduction

The Department of Urban and Regional Planning of Bangladesh University of Engineering and Technology (BUET) in collaboration with LGED, has implemented a project - namely Planning and Prioritisation of Rural Roads in Bangladesh - to develop an appropriate planning and prioritisation model for the rural roads in Bangladesh. The project was sponsored through the Research for Community Access Partnership (ReCAP) programme, a UKaid 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, a Training of Trainers (ToT) programme was organised on January 20 – 21, 2018. The training, held at the Central Training Unit of LGED, was jointly organised by the Department of Urban and Regional Planning and LGED.

The purpose of the ToT was to train LGED professionals as trainers to facilitate on-going uptake of the Rural Road Planning and Prioritisation Model (RPPM) developed as part of the project. The programme details of the training is attached as Annex A to this report.

The training programme was attended by 18 LGED officials from the headquarters and field-level offices in Tangail. Among the participants there were two female Assistant Engineers posted at LGED Head Quarters. The list of participants is attached as Annex B to this report.

3   Inaugural Session

The inaugural session of the training programme was chaired by Mr. Md. Ali Akhter Hossain, Superintending Engineer (Planning), LGED. Professor Dr. Afsana Haque, the Head of the Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology (BUET), Professor Dr. Abdul Quium, Team Leader, Planning and Prioritisation Rural Road in Bangladesh project also addressed the session.

Dr. Quium, in his presentation elaborated the purpose and features of RPPM tool by referring to its effectiveness for developing rural roads. While focusing on the RPPM model, he drew attention to the factors considered to develop the tool. He also referred to the critical issues to be considered by LGED to replicate the tool in other districts of Bangladesh. In addition to this, he discussed about the importance of the tool in improving the accessibility of rural poor in Bangladesh. In conclusion, he mentioned the features of the tool in generating maps and other outputs of a prioritised road.

Professor Haque, in her speech, drew attention to the importance of the prioritisation of roads. She mentioned that LGED had long been responsible for constructing and maintaining rural roads. Therefore, this RPPM model, with its successful application in other districts of Bangladesh, would assist LGED for more effective and efficient rural road development. She thanked ReCAP for giving an opportunity to the Department of Urban and Regional Planning to accomplish the action research for LGED. She also reiterated the interest and commitment of the Department of Urban and Regional Planning in continuing such collaboration, if needed.

Finally, Mr. Hossain, SE (Planning), LGED welcomed all and formally opened the training session with an appreciation of such a project in Bangladesh. He emphasised the importance of prioritisation in the development of rural roads. He also thanked the BUET team and ReCAP for helping LGED developing a web-based application tool that had immense potential to be replicated all over the country and ease the job of making right investment at the right place.

4   Proceedings of the ToT

4.1   Summary of the Methodology of RPPM

In the first presentation, Dr. Abdul Quium, Team Leader of the project, gave a summary of the methodology used to develop RPPM. He mentioned that the methodology had two major components. The first component followed a network approach to rural road planning focussing on access and connectivity; and the second component involved prioritisation of road development based on the outcomes of Cost Benefit Analysis (CBA) and Multi-Criteria Analysis (MCA). Both the components included the provision of local stakeholders' participation. The methodology was generalised, as much as possible, to make it applicable all over Bangladesh. He also emphasised that Government policies and objectives and some broad criteria, were considered to develop core networks of rural roads at the upazila and union levels. The market/activity centres form the nodes, and RHD roads, Upazila and Union roads and selected village roads connecting them were the links of the core network.

In choosing the criteria, he mentioned that applicable criteria for each of type of road development were selected from among a list of potential criteria by conducting an Analytic Hierarchy Process (AHP) survey among the stakeholders including experts and LGED officials at Head Quarters and field offices. The AHP technique also was used to determine the relative importance or weights of the selected criteria. The final values of the selected criteria were standardised on a common scale of 0 to 100 to allow for their summation. Finally, the MCA score of each road was calculated by summing the product of the standardised values by their weights. The MCA results complemented the CBA results (EIRR values), especially for low volume roads. A high MCA score of a road reflecting its significant non-monetised benefits may also justify its priority for development even if the EIRR value is low.

The priority ranking for improvement of roads is based on EIRR values except for low volume earth roads. MCA scores are used for priority ranking of low volume earth roads and priority for road maintenance.

He concluded his presentation highlighting the capability of RPPM in future rural road development. He also discussed the major features of the RPPM methodology.

4.2 Practice Session on RPPM

Professor Mohammad Shakil Akther took the trainees through the entire process of using the RPPM tool in details. He demonstrated the ways in which the RPPM tool can be accessed. He then showed the trainees how to navigate between different interfaces and features of RPPM. He discussed on checking different menus of the tool, process of generating output under different rural road prioritisation types, selection of a particular upazila to generate relevant outputs. He also mentioned how the tabular outputs could be exported to different file formats such as Microsoft excel and pdf.

He demonstrated the process of generating maps of core networks. This was followed by visualisation of important geographic features around the core networks, and generating legend and changing the symbols, if required. He concluded the session by highlighting the process of displaying attribute data with the map output followed by the ways the maps could be downloaded into the local system for further use.

In the session Dr. Akhter explained how the tool may be replicated in other districts and what additional data would be required in this regard. He mentioned that existing LGED database did not

have data on local priority of roads, road safety condition and village roads eligible for inclusion into core network. So, these data will have to be collected and input into database used by RPPM.

4.3 Session on Conducting Local Workshop

Dr. Md Musleh Uddin Hasan described how to conduct local workshop at upazila level. He mentioned that such workshops were essential to collect data on local priority of roads and road safety condition and to prepare and validate core network. As these data are not currently available in LGED's road and GIS databases, those have to be collected from the local workshop participated by local leaders and other stakeholders. He mentioned that such local workshops would make application of RPPM more acceptable to the local people.

4.4 Discussion by the Participants

The discussion session was moderated by Mr. Abul Monzur Mohammed Sadeque, Executive Engineer (Planning), LGED. He also made a presentation on the role of rural roads in development of Bangladesh. He discussed how rural roads helped in building the local economy, making the country more prosperous and how LGED could play a role to help develop the economy further. He was also keen to know feedback from the participants on RPPM and the User Guide.

The discussion in the session was centered on issues to roll RPPM out in other districts, especially organising workshops, updating of LGED road database and input of additional data collected at the local workshop.

Participants wanted to know more on Cost Benefit Analysis (CBA) and sought some clarifications on Multi-Criteria Analysis (MCA). The BUET team and Mr. Sadeque clarified some of the issues raised by the participants. Clarifications were also sought on input of additional data collected at the local workshop. The possible alternative arrangements for updating of database were also discussed. It was agreed that the work should be managed by LGED with additional resources. Additional manpower required for the work could be mobilised from local educational institutions such as polytechnic institutes and colleges. In conclusion the participants agreed that RPPM would be a useful planning tool for LGED.

5   Evaluation of ToT

After the discussion session of the workshop, feedback on ToT were collected from the participants. The evaluation form is shown in Annex E. The participants appreciated the concept of priority appraisal for road development in RPPM and the concept of core network. They realised that prioritisation was necessary for the proper utilisation of resources and hoped that in the future RPPM would be an effective tool for planning and prioritisation of rural road development in Bangladesh.

Some of the participants wanted to know more details about the organisation of stakeholders workshop at local/upazila level. They observed that inclusion of group discussion or brain storming among the participants could have made the ToT more effective. They also suggested that as many of them were not so familiar with the appraisal tools used by RPPM, inclusion of lectures on those tools could have been useful. Some of them pointed out that it was not clear to them how data collected from the local workshops were to be entered in the new input table of the road database and suggested clarifications on the matter should be provided in the User Guide.

They observed that it may take some time to implement RPPM in other districts of the country. However, before RPPM may be implemented, they proposed that those criteria which were considered in RPPM could be used by LGED.

In general, the participants were of the opinion that the training was well organised and the course materials were useful. All of them agreed that their participation and interaction were encouraged. They agreed that the experience gained from the training would be useful in their work. Except one, all of them agreed that the training objectives were met.

The details of their opinion on different aspects of the training are provided in Table 1. Response of the trainers about their comments and suggestions are provided in Annex F.

Table 1: Response of participants on different aspects of training

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The objectives of the training were clearly defined	72%	22%		6%	
2. Participation and interaction were encouraged		100%			
3. The topics covered were relevant to me	50%	50%			
4. The content was organised and easy to follow	11%	89%			
5. The materials distributed were helpful	22%	78%			
6. This training experience will be useful in my work	39%	61%			
7. The trainer was knowledgeable about the training topics	22%	78%			
8. The trainer was well prepared	22%	72%	6%		
9. The training objectives were met		94%	6%		
10. The time allotted for the training was sufficient	39%	61%			
11. The meeting room and facilities were adequate and comfortable	39%	61%			

6   Closing of ToT

At the beginning of the closing session Dr. Abdul Quium briefly summarised the activities done in the ToT. In his speech Md. Abdur Rashid Khan, Superintending Engineer (Training), LGED congratulated all the participants for successfully completing the training programme. He enquired about their learning from the training.

Mr. Mir Ali Shakir, Upazila Engineer, Delduar responded on behalf of the participants. He mentioned that in order to apply RPPM, updating of the road database was an immediate requirement and would require additional logistics support and resources from the headquarters.

The session Chair Mr. Iftekhar Ahmed, Additional Chief Engineer (Planning), LGED explained why prioritisation was needed. In this regard, he hoped that the application of RPPM would facilitate decision making capacity in LGED. He discussed how budget allocation on rural road development had increased in the past. However, in future resource allocation may not follow the past trend and

therefore, future road development should be selective based on prioritised requirements. He also mentioned that for so long LGED had been focusing on rural accessibility but in the future the focus would be shifted to rural transport.

Mr. Ahmed urged the trainees to give their feedback as soon as possible to the BUET team so that the User Guide on RPPM can be revised as per requirements of LGED. He assured the participants that LGED would take initiative to update the road and GIS databases in near future. Finally, he thanked the participants for their active participation in the discussion of the workshop.

The programme finished after awarding of certificates to participants and then with a note of thanks to all concerned.

Annex A: Programme of ToT

Planning and Prioritisation of Rural Roads in Bangladesh
Training of Trainers (ToT)
20 - 21 January, 2018
Venue: Central Training Unit, LGED Head Quarters, Dhaka

DAY 01: 20 January, 2018

10.30-11.20	Inaugural Session
10.30-10.40	Welcome Speech
10.40-11.00	Presentation on Rural Road Planning and Prioritisation Model (RPPM)
11.00-11.20	Speech by Chair

11.40-1.00	Morning Session
11.40-12.25	RPPM Methodology
12.25-1.00	RPPM Practice Session 1: Getting Started with RPPM

2.00-5.00	Afternoon Session
2.00-3.30	RPPM Practice Session 2: Generating RPPM Output Tables
3.45- 5.00	RPPM Practice Session 2: Generating RPPM Output Tables (Continued)

DAY 02: 21 January, 2018

10.00-1.00	Morning Session
10.00- 11.15	RPPM Practice Session 3: Generating RPPM Map Outputs
11.30- 1.00	Data requirements for RPPM and Sources
	Replication of RPPM in other Districts

2.00-3.45	Afternoon Session
2.00-2.45	Local Workshop – Additional Data Acquisition
3.00-3.45	Presentation: Role of Rural Roads in Development of Bangladesh
	Review of RPPM - Q & A and Evaluation

3.45-4.30	Closing Session
3.45- 4.00	Certificate Distribution
4.00-4.30	Closing Speech followed by Refreshment

Annex B: List of Participants

Planning and Prioritisation of Rural Roads in Bangladesh

Training of Trainers (ToT)
20 - 21 January, 2018
Venue: Central Training Unit, LGED Head Quarters, Dhaka

List of Participants

1. Md. Delower Hossain Mozumder, Executive Engineer, Tangail

2. Md. Sohel Rana, Senior Assistant Engineer (SrAE), GIS Unit

3. Mir Tanweer Husain, SrAE, RTIP-Ii

4. Mohammad Zakir Hossain, SrAE, GIS

5. Md. Firoz Alam Talukder, SrAE, MGSP

6. Masud Rahman, AE, Maintenance, LGED

7. Mohammad Masudur Rahman Mallik, AE, ECRRP, LGED

8. A. K. M. Mostafa Morshed, AE, Planning

9. Ripon Hore, AE, BAIDP

10. Rokibul Hasan, AE, GIS Unit

11. Sarthak Halder, AE, PME Unit

12. Abu Bakar Md. Siddique, AE, Design Unit

13. Md. Arifur Rahman, AE, Mirzapur

14. Mir Ali Shakir, UE, Delduar

15. Kazi Fahad Quddus, UE, Sakhipur

16. Fatema Sultana, SrAE, Lged

17. Farhana Lima, AE, UMU

18. Md. Faridul Islam, AE (Planning)

Annex C: List of Trainers

Planning and Prioritisation of Rural Roads in Bangladesh

Training of Trainers (ToT)
20 - 21 January, 2018
Venue: Central Training Unit, LGED Head Quarters, Dhaka

List of Trainers

1. Dr. A S M Abdul Quium, BUET

2. Prof. Dr. Mohammad Shakil Akther, BUET

3. Dr. Md. Musleh Uddin Hasan, BUET

4. Mr. Abul Monzur Mohammad Sadeque, LGED
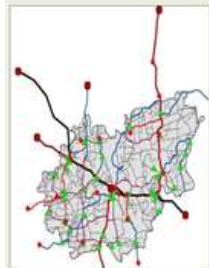
Annex D: Sample ToT Slides

Local Government Engineering Department

Training-of-Trainers
Rural Road Planning and Prioritisation Model (RPPM)

20-21 January 2018, Dhaka

Delivered by:
Department of Urban and Regional Planning
Bangladesh University of Engineering and Technology

Purpose of the presentation

- Context of the study
- Objectives and overview of the project
- Methodology for the study (covered separately)
- Rural Road Planning and Prioritisation Model (RPPM)
    - A web-based tool for planning and prioritisation of rural roads

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Some features of rural road network in Bangladesh

Present situation:
- Rural Road network length: about 321,000 km (2.18 km/sq km)
- Paved (BC/CC/RCC): about 74,000 km:
- Brick paved: about 20,000 km (to be paved in future)
- Maintenance – an issue
- Not all villages connected by all-weather road

Further development should be selective:
- Network can be sustained and properly maintained
- Meets transport needs
- Enhance rural access/connectivity at all levels.

Planning and Prioritisation of Rural Roads in Bangladesh

- A project under the **ReCAP** programme – a UK Aid funded programme to promote safe and sustainable rural access in Asia and Africa
- BUET with direct support of LGED has implemented the project
- The project started in April 2016 and expected to finish project activities by January 2018

Planning and Prioritisation of Rural Roads

Objectives of the project include:

- Develop a methodology on planning and prioritisation of rural roads for development and maintenance
- Develop a software to implement the methodology
- Prepare a user manual for the software; and training of 15 professionals to apply the methodology and use the software.

Overall approach to planning and prioritisation

Two components:
- Network Planning (Core network)
- Prioritisation
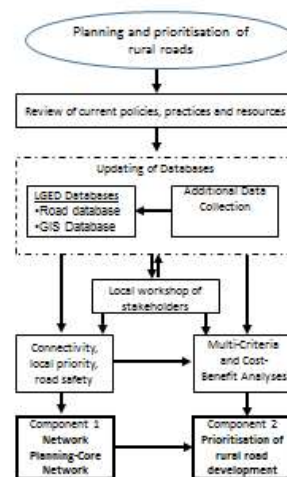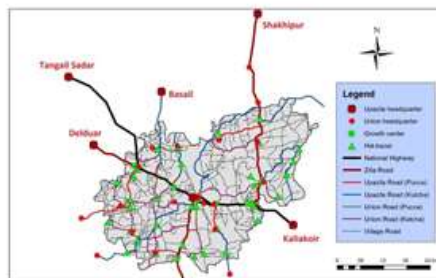
RPPM — a tool to implement the methodology

Main features of RPPM
- Focuses on rural accessibility/connectivity
- Reflects government policy on rural road development
- Accommodates local needs and priorities including SDG
- Considers resources and capacities within LGED
- Minimal additional data collection
- Can be easily replicated in other districts
- Contributes towards building a digital Bangladesh

RPPM implemented on GIS Portal of LGED

RPPM can do the following tasks:
- Generate prioritised lists of roads for improvement, further improvement and maintenance
- Generate maps of core road networks
- Maps of prioritised list of roads

RPPM implemented on GIS Portal of LGED

Types of road development by surface type

Type of road development	Surface type
Improvement	Low traffic volume earth road
	High traffic volume earth road
	Partly paved road
	Fully HBB road
Maintenance	Partly paved road
	Fully HBB road
	Fully paved road
Further Improvement	Fully paved (Full BC/RCC, HBB)

Details of evaluation outcome and ranking of an individual road

RPPM Output

Core network – Basail upazila

List of roads in core network – Basail

Road maintenance priority list

Prototype illustration: socio-economic facilities along a partly paved road for *improvement*

Prototype illustration: road with socio-economic facilities along a road selected for *further improvement*

Replication in other districts

- Most data are to come from Road and GIS databases — should be reviewed and updated before using for RPPM
- Current unit road construction and maintenance cost, tax rate etc.

Two new table are to be appended to the road database:

- Some road data are to come from local workshops : Connectivity, local priority (including SDG goals), road safety; and verification of preliminary core network
- Appending the table on vehicle operating cost and passenger time savings to the district road database

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Summarize: Rural Road Planning and Prioritisation Model (RPPM)

RPPM is a web-based tool; generate 4 types of outputs:

- Generates core networks at upazila and union level
- Priority lists of roads (8 types as requested)
- Priority score table with basic information, details of priority scores, and CBA and MCA results of a road, and
- Maps showing prioritised roads on an upazila map.

RPPM is expected to enhance decision making capacity in LGED regarding selection of rural roads for development

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Thank you

Annex E: Questionnaire for ToT Evaluation Survey

Training Evaluation Form
For participants under the project BAN 2072A: Rural Road Planning and Prioritisation

Date: _____

Instructions: Please indicate your level of agreement with the statement listed below in #1-11

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The objectives of the training were clearly defined	○	○	○	○	○
2. Participation and interaction were encouraged	○	○	○	○	○
3. The topics covered were relevant to me	○	○	○	○	○
4. The content was organised and easy to follow	○	○	○	○	○
5. The materials distributed were helpful	○	○	○	○	○
6. This training experience will be useful in my work	○	○	○	○	○
7. The trainer was knowledgeable about the training topics	○	○	○	○	○
8. The trainer was well prepared	○	○	○	○	○
9. The training objectives were met	○	○	○	○	○
10. The time allotted for the training was sufficient	○	○	○	○	○
11. The meeting room and facilities were adequate and comfortable	○	○	○	○	○

12. What did you like the most about this training?

13. What aspects of the training could be improved?

14. How do you hope to change your practice as a result of this training?

15. Please share your comments or expand on previous responses here:

Annex F: Response to the Comments and Suggestions Received from the Participants

The participants wanted to know more about the process of data collection through local stakeholders workshop. It was clarified by the BUET team that information on connectivity of rural roads and their local priority would be collected from workshops. In order to make the data collection task easier, the survey form (attached as an annexure to the User RPPM Guide) has been redesigned to collect these information.

Some of them pointed out that it was not clear to them how data collected from the local workshops were to be entered in the new input table of the road database and suggested clarifications on the matter should be provided in the RPPM User Guide. As suggested by them, the matter has been clarified in the final version of the RPPM User Guide.

LGED assured that future training/ lecture sessions for the participants will be arranged to make them more informed about the concepts of appraisal tools used by RPPM.

Annex G: Photographs

Photograph 1: Inaugural Session of the ToT

Photograph 2: Participants of ToT

Photograph 3: Impression shared by the participant in the closing session

Photograph 4: ToT completion certificate awarding moment