Participatory Approach for Roadside Protection of Rural Roads in Nepal

Training Report

HELVETAS Swiss Intercooperation Nepal

NEP2071D

May 2020
NEP2071D Training Report

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Cover Photo: viewing e-learning course and checking the query of the participants by Project Coordinator.

Quality assurance and review table

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<th>Reviewer(s)</th>
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Abstract

This report describes the proceedings of the on-line e-learning training course on the Right of Way (RoW) Utilisation Manual. Due to the COVID-19 pandemic and the subsequent lockdown, it was not possible to organise face to face training, thus this format for an e-learning format was adopted. The report summarises the training course, the presentations and lecture notes, the self-assessment results, together with feedback and suggestion formats for participant response. The aim of this e-learning online course was to share information and knowledge derived from the project entitled, ‘Participatory Approach for Roadside Protection of Rural Roads in Nepal’ (NEP2071D), and thereby enhancing knowledge on the application and processes involved in the utilisation of the Right of Way areas along the roads of Nepal. This course is supported by the published Right of Way Utilisation Manual. The target participants of this training course are the technical officers, essentially but not exclusively the Engineers and Sub-Engineers, of the local government working in the roads sector. An important motive for preparing the course in this format was to be able to deliver the knowledge from the project to the target audience in the difficult situation caused by the COVID-19 pandemic.

The results of the training shows that it was largely successful in achieving its objectives. It is considered that this type of e-learning course is beneficial to the target audience, and, in the current lockdown situation, possibly making their home-based circumstances more productive.

Key words:

Roadside plantation, road policies, road governance, site protection, Right of Way utilisation, participatory approach, and knowledge sharing, e-learning, training materialsBio-engineering.

Acknowledgements

We would like to extend our gratitude to the ReCAP team, Mr. Mahesh Chandra Naupane (Senior Divisional Engineer DoLI).

Research 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.

www.research4cap.org
**Acronyms, Units and Currencies**

$ United States Dollar (US$ 1.00 ≈ NRS 110)
ADB Asian Development Bank
ASCAP Asia Community Access Partnership
DoLI Department of Local Infrastructure
GPS Global positioning system
Hh Household
MoU Memorandum of Understanding
MuAN Municipality Association of Nepal
MoPP Ministry of Physical Planning
NRS Nepali Rupees
NARMIN National Association of Rural Municipality of Nepal
ReCAP Research for Community Access Partnership
RoW Rights of Way
RUG Road Users Group
TDP Town Development Plan
TMP Transport Master Plan
UKAid United Kingdom Aid (Department for International Development, UK)
1. Introduction

The Pilot Study to investigate a Participatory Approach for Roadside Protection of Rural Roads in Nepal (NEP2071D) started on 1 July 2017 with the objectives of researching the provision of livelihood opportunities for people living close to the road, and building on the access-to-markets potential provided by the roads, and thereby helping to reduce poverty. In addition, the plantations to be established within the Right of Way (RoW) are expected to provide improved road protection, particularly on steeper roadside slopes. This training report is a product of Phase 2 of the project, which followed on from Phase 1 (Developing a participatory approach for roadside protection of rural roads in Nepal, NEP2071A) which investigated the viability of the research and identified suitable plants and sites.

After nearly three years since the project initiation, the project is now at the stage where a considerable level of experience has been gained, particularly on the impact of the rolling out of the federalisation process in Nepal.

This report provides an overview of the proceedings of the e-learning training course prepared for the technical officers of the new urban and rural Municipalities, and supports the published Right of Way Utilisation Manual, which was prepared based on the project’s learnings and experiences. Utilisation of the RoW areas which run parallel to the roads has two main purposes: firstly, protecting the roadside through bio-engineering and establishment of plantations by the local communities, and secondly, contributing to the incomes of the poor and disadvantaged households through sale of the produce from the plantations.

The e-learning training course was designed to reach out to a wide range of participants involved with and concerned about the road system in Nepal, especially those working in the Municipalities and at the Province level. It is also relevant to development workers in the fields of poverty alleviation and livelihood generation.

This report summarises the e-learning training proceedings including the process, the modules, the presentations, the results and an assessment of the course. A total of 221 participants throughout Nepal have enrolled to date to take the on-line course. At the time of writing, 73 technical officers have completed the training course, and their knowledge after completing the training was assessed. The knowledge they have obtained from this course was found to be very beneficial.

Many of the participants also provided feedback and suggestions about the methodological process, and the training materials, which have been recorded; such feedback is most helpful in designing such types of e-learning courses in the future.
2. Background

The Project entitled *Participatory Approach for Roadside Protection of Rural Roads in Nepal* started from 1 July 2017 and will end on 31 May 2020. The two pilot sites selected for the project to test the approach designed in Phase 1 of this project are both located in Dhankuta District, representing the Middle-hills of the lower Himalaya range in Nepal. Both sites are situated along the same 20 km stretch of road from Hile-Chhintang, with Site-1, 1 km from the Ilaka Police Station traveling toward Shambu Gaon, and Site-2, 2.1km from Dharmashal tower travelling toward Marga Bazaar. Site-1 is located in Sahidbhoomi Rural Municipality (Local Government or *palika*), and Site-2 crosses the boundary between Pakhriras Municipality and Dhankuta Municipality. Work began at Site-1 in 2017 and at Site-2 in 2018. Establishment of *amrisso* (broom grass) plantations at both sites was completed in July 2018 during the monsoon season.

Under Nepal’s new federal constitution (2015) and as a result of the resulting administrative changes, the roles and responsibilities of different institutions involved in Right of Way (RoW) management and utilisation have yet to be fully clarified. However, the Constitution (2015) and the Local Self Government Act (2017) have already delegated executive and concurrent powers to the Provincial and Local Governments (both urban and rural Municipalities), assigning the responsible for managing local infrastructure including rural roads, and hence the management of the RoW areas along these roads, to the Municipalities.

The project has been running smoothly, and by February 2020 had met 15 of the 17 set milestones. One of the activities that remained at the end of February 2020 was to provide training to the Municipal engineers on ROW utilisation. This had been planned for the last week of March, but due to the COVID-19 global pandemic, which has affected some 188 countries\(^1\), Nepal joined other countries in controlling the spread of the virus through a lockdown, which began on 24 March 2020 and has not been lifted completely yet (June 29, 2020). The GoN has hinted that the lockdown might be further extended into June. Due to this unprecedented situation, an alternative option had to be found to deliver the training – hence the preparation and delivery of this e-learning course described herein.

2.1 Project Aim

The overall aim of the project is to demonstrate that the RoW can be used for reducing poverty and instigating economic prosperity while providing improved road protection for roadside slopes.

2.2 Project Objectives

The specific project objectives as defined in the Terms of Reference for the project are as follows:

- to pilot the institutional structures as recommended by the project’s first phase,
- to adjust the methodology and manual with the experience of factual implementation,
- to devise a basis for revenue sharing among the beneficiaries and local government,
- to link roadside plantations with road maintenance and slope protection.

2.3 Training Purpose

The main purpose of the training is to provide knowledge and skills to road sector engineers on the utilisation of the RoW areas of local roads under the jurisdiction of the Municipalities. The training requires full time attendance and active participation of all the participants, and the course is presented in both English and Nepali languages.

\(^1\) [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200626-covid-19-sitrep-158.pdf?sfvrsn=1d1aae8a_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200626-covid-19-sitrep-158.pdf?sfvrsn=1d1aae8a_2)
3. Training Methodology

The original idea of the training was to deliver face to face training to the target audience in a classroom environment, coupled with a practical field observation visit. As this was not possible due to the COVID-19 pandemic, the following process was followed in the development of this course.

a) The course was developed based on the training materials submitted to ReCAP in February 2020, and includes a training session plan, and training materials in the form of power point presentations. These presentations were elaborated for each session into lecture notes so that trainees can download, read and study at their own pace. A brief self-assessment, mostly in the form of multiple-choice questions, was also developed for completion by the participants at the end of each session and module so that the trainees could self-assess their progress.

b) The e-learning training site was then developed in the form of an interactive webpage.

c) The training course including presentations and lecture notes were uploaded onto the webpage.

d) All Municipalities and the Infrastructure Development Offices in the country were contacted through email with a formal letter attached, and with a request for their engineers and other interested staff to take the course.

e) The number of participants and their feedback were recorded.

f) This report covering the development process, the contents and the outcomes of the training course was prepared.

4. Participants

The minimum participants targeted for this course were the Technical Officers of the local Governments, who are mostly Engineers, Sub-Engineers and Officers. Based on the number of technical officers who were met during the project and who attended the workshops, it was expected that the number of participants to take the course would be around 75 persons. A total of 221 participants throughout Nepal enrolled to take the on-line course, and 73 completed it, as recorded in Table 1 below. The one disappointment is that only four women (5%) completed the course, a reflection of the very few women amongst the engineers in the Municipalities. The details of the course participants and their assessment scores are presented in Annex 1.

Table 1: Summary of workshop participants

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<thead>
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<th>Category</th>
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<td>73</td>
<td>5</td>
</tr>
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<td>All Participants</td>
<td>73</td>
<td>5%</td>
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</table>

5. Summary of the Training Course Structure

The training was divided into nine modules. A small background chapter was developed to provide background, context and familiarise the student with the objective, activities, experiences and outputs of the pilot study of the research work.

The 9 modules were prepared in the form of powerpoint presentations and lecture notes, and are described in the following section.

Participants could access the course by logging-in to http://elearning.helvetasnepal.org/. The users’ manual for the e-learning course was developed and shared along with the information letter, referenced in Section 3. The user’s manual for the course is attached as Annex 2.
5.1 The Trainings Modules

The lecture notes for these modules were prepared in the Nepali language for ease of comprehension by the Technical Officers, not all of whom will be fluent in English. The lecture notes were attached to the PowerPoint presentations in the on-line course materials. The presentations associated with each of the modules described below are presented in Annex 3.

Module 1: Course Introduction
- Course content and process
- Brief introduction of pilot project
- Project objectives
- Concept of RoW Utilisation
- Field level works, the stakeholders and their roles.

Module 2: Overview of Local Roads in Nepal, Legal Aspects and Utilisation of the Right of Way
- Constitutional Provisions for the Road Sector
- Definitions and Classifications
- Status of Roads in the Provinces
- The Opportunity for RoW Utilisation.

Module 3: Site and Plant Selection
- Coordination with concerned stakeholders
- Develop site selection criteria with concerned stakeholders
- Develop plant selection criteria with concerned stakeholders.

Module 4: Detailed Survey of Selected Site
- A desk study on the selected site describing road category, the final geometry of the road, and taking into account bio-engineering principles and factors which are relevant to site selection.
- Safety considerations that must be taken into account while working in sloping roadside areas.
- Preparation of formats and logistic arrangements
- A work plan for necessary site activities
- Criteria for plant selection
- Civil Engineering designs and cost estimates
- Bio-engineering designs and cost estimates.

Module 5: Formation and Mobilization of Users Committee
- Formation and Mobilization of Road Users Groups in the following stages.
  a) Programme planning and preparation
  b) Programme implementation
  c) Programme monitoring and evaluation.

Module 6: Site Preparation and Plantation
- Planning of the works
- Construction of civil engineering structures
- Preparations for fencing
- Provision for irrigation
- Layout and land preparation for plantation
- Establishing the plantation.

Module 7: Plant Maintenance, Composting, Harvesting
- Fencing to protect plants from free grazing animals
- Weeding
- Mulching
- Composting
Module 8: Value Addition and Marketing of a Broom Grass Crop
- Value addition in broom grass
- Value chain and market system development
- Marketing skills
- Enhancing enabling market environment.

Module 9: Training Evaluation
- Knowledge test questionnaires by module
- Collection of feedback
- Documentation.

At the end of each of the modules, questionnaires, built-in with the content and lecture notes, are presented for self-assessment. Almost all 73 participants who completed the course answered the questions and participated in the self-assessment process. The questionnaires developed for the self-assessment are presented in Annex 4.

6. Results
A total of 221 participants from throughout Nepal enrolled in the on-line course, and till 25 May 2020, 73 technical officers, the Engineers and Sub-engineers from the Municipalities, had completed the training course. From the results of the self-assessments, attached in Annex 1, it is assumed that the participants who completed the course had gained the following knowledge.

- Obtained information about the project, its concept and the approaches involved in ROW utilisation.
- Became familiar with the legal and technical aspects of utilizing the Right of Way to protect local roads.
- Understood the importance of coordination with concerned stakeholders.
- Understood the principles and practices involved in;
  - site selection and the plant selection criteria for RoW Utilisation,
  - the formation and mobilisation of user groups or committees who would undertake the plantation work,
  - the plantation and maintenance works,
  - harvesting, value addition, and assessing the value chain,
  - developing the market system and marketing of the products.

The scores obtained from the self-assessment are summarized and categorized in Table 2.
Table 2: Scores Obtained from the Self-assessment.

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<td>601 and above</td>
<td>27</td>
<td>37%</td>
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<td><strong>Total</strong></td>
<td><strong>73</strong></td>
<td><strong>100%</strong></td>
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Self-assessment questionnaires were included from Module 2 and ended at Module 8. All questions had the equal value, and the total number of points obtainable was 700.

As shown in Table 2, 37% of students obtained a score of >600 (very good), while 41% achieved a score of 400-600 (good). Some students achieved 100%. In the satisfactory bracket, 7% scored between 200 and 400.

It can be said therefore that 78% participants have significantly upgraded their knowledge of the practices and processes involved in the use of RoW areas for plantations.

A multiple choice and open questionnaire was included with Module 9. The answers to this questionnaire provided the feedback on the course contents, which is included in Annex 5.

7. Assessment

This was a new and unexpected activity for the project to undertake, and for Nepal it was a new and innovative approach for the enhancement of knowledge in the development sector, which to our knowledge had not provided training before through an online e-learning course.

The project team made every effort to ensure that different aspects of the training were properly designed and implemented - such as:

- sound preparation of targeted course materials and lecture notes,
- ensuring reasonable numbers participated in the training course,
- maintaining records of how many people enrolled,
- collection of how many people asked for further information or feedback,
- recording of suggestions from participants for course improvement,
- an analysis of the questionnaires.

During preparations, the facilitators and those involved in designing the course met or, after lockdown, contacted each other regularly to propose improvements to the course. The design of the self-assessment questionnaires, which in the end totalled 25 questions, was particularly challenging, and developed over time.

A total of 47 participants, including the four women, provided feedback and suggestions on the course structure and contents. The training course contents were considered and rated by the participants useful to very useful, in terms of obtaining knowledge on the different module topics. In regard to the mode of training through an on-line web-based e-learning format, the participants rated the mode of training effective to very effective, and some of the participants asked the facilitators to organise such type of course again in the future. Particularly constructive comments from the participants included those which suggested that an improvement would to include, photos, video clips, financial analysis, and the most important acts, relevant to the establishment of RoW plantations – see Annex 5. These comments highlight the weakness of short on-line courses, in that there is no opportunity for field trips and hands-on field experience, from which so much can be learned.
8. Conclusion

The e-learning training course was designed and executed enthusiastically, as it was different than the traditional and customary practices of formal dignitary-laden openings with unproductive speeches and rituals. It was focused and smooth, and every session shared useful information and learnings – which could be studied many times and at the convenience of the student participant. The presentations were relevant and supportive to the key theme of the project, and the audience and the project team learned from the process.

In addition, the local governments’ technical officers learned how the RoW Utilisation Manual could help in reaching the wider social, economic and environmental priorities of the local governments, and in proper use of the RoW land. Some areas of improvement in designing the course have been taken on board – these include more relevant materials, more visuals and photos, and more in-depth analysis of socio economic and environment related issues and facts.

753 local governments have been made aware through the official letter about the existence and usefulness of the training course for the technical officers. Due to the long lockdown in Nepal and subsequent closure of the government offices due to the COVID-19 pandemic, most of the technical officers were on leave, residing in their hometowns, where internet access with reasonable bandwidth is not always available – in fact, in most of rural Nepal, there is little regular internet access at all, unless the expensive option of mobile data through 3G or 4G is considered. Considering the current situation in Nepal, the project team is very pleased how the training was received, and it is considered to have been successful and effective.

9. Scope

There is huge future scope of e-learning courses reaching many technicians and development professionals in an economical manner in Nepal – in fact, as the internet coverage in the country rapidly improves, so does the potential audience and participation.

As the world learnt how to meet over Zoom during the nearly world-wide lockdown, the project team learnt almost from scratch how to design, prepare, develop and generate an e-learning platform and course. Those involved in its development, including Helvetas Nepal, will see this as an extremely useful learning as it was an effective modality for reaching and delivering knowledge to a significant number of technicians and practitioners.

With further publicity and encouragement, the number of technicians taking this course might easily rise to well over 100. The e-learning format is seen as cost effective – for example, no travel or hotel bills - it is not time bound, and its relevance to a developing country like Nepal where travel is expensive or time-consuming and difficult, is high - whether there is a lockdown and pandemic or not.
## Annex 1  List of Participants Who Completed the E-Learning Course

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<td>3</td>
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<td>-</td>
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Annex 2  User’s Manual for E-Learning Course

User Manual on Navigating the Helvetas E-learning Portal

1. Visiting the main page of the e-learning platform of Helvetas (http://elearning.helvetasnepal.org/) takes you to this page.

2. Click on “Create new account” at the bottom left corner to register your account. The following window will appear.

Fill the requested information and click the “Create my new account” at the bottom of the page. Please remember your Username and Password for logging in next time.

Once your request is approved by the administrator, you can login to the system anytime at your convenience.

Steps 1 and 2 are for the first-time user ONLY.
3. Login with the **username and password** created during registration process. As soon as you are logged in successfully, you are redirected to the following screen:

4. Click the desired course (for the current case it is: **An online course on Right of Way Utilisation**) you applied for and click announcement section to see details about the course and any further instructions:
5. Now click the Module 1 to start the course.

6. The presentation slides may not fit well on your screen; if this is the case, click the three lined icon at the top left corner to expand the area so that main menu is minimized.
7. Once you finish the presentations, please go to the corresponding handbook in each module and read them carefully.

8. You can now click the three lined icon in the top left corner to bring the menu back or you can use the navigation route available in the header section of every box. In this case, the root of the navigation bar is course number as highlighted below.

9. After you finish reading the materials for this module, please go to the bottom of the page to see the rest of the sub sections such as Self-assessment and Feedback. Please complete them all.

10. You can complete the self-assessment by clicking the primary link and then the “Attempt quiz now” button.
11. Now complete the quiz in each module. There are quizzes from Module 2 to Module 8.

According to the Constitution of Nepal 2072, how many local levels are provisioned?

Select one:
- a. 753
- b. 532
- c. 751

In which year was the Public Road Act formulated?

Select one:
- a. 2031
- b. 2030
- c. 2032

12. After the completion of the quiz, please don’t forget to click the “Finish attempt” button.

13. There are feedback forms in every module; you can click the “Queries and feedback” link to ask any question related to the module. The assigned teacher will get back to you based on your question or feedback.
All of the above processes apply for all modules.

14. Once you reach module 9, there is an explicit section to provide feedback on the entire training; you are strongly encouraged to visit this page and provide your valuable feedback and comments on the four questions. Thanks you!

YOU MUST CHECK THE MODULE COMPLETION TICK MARK available in each module and its subsequent sections. This is essential for you in order to obtain your Course Completion Certificate

15. Once you have finished all modules and its sub-modules, the link to download the Certificate will be active and you can download the training completion certificate.
Annex 3  PowerPoint Presentations for Each Module

Module 1

Module Information

Module Objectives
- To improve the preservation of roads, particularly on steep road slopes.
- To provide legal and physical boundaries for people living close to the road.

Summary of Pilot Project used ROW utilisation concept

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Overview of Site #1 Chilantang

Overview of Site #2 Marga

Stakeholders

- Government of Nepal (DoE), Provincial and Local Level Governments
- NDRR, UK Government
- Primary beneficiaries (ROCs)
- CAMPOPA, UK, RACAP
- HELVETAS Nepal (administration)
Module 2: Overview of Local Roads in Nepal, Legal Aspects and Utilization of the Right of Way

Mahesh C. Neupane
Senior Divisional Engineer
DoLi, Government of Nepal

Module Outline
- Constitutional Provisions for the Road Sector
- Definitions and Classifications
- Status of Roads in the Provinces
- The Opportunity for ROW Utilization

Constitutional Provisions Related to Road Infrastructure
The Constitution of Nepal 2074 (2018) describes provisions relating to roads in the following sections:
- Schedule 6: List of State Power: 12. State highways
- Schedule 8: List of Local Level Power: 21. Local roads, rural roads, agrimotor roads, irrigation
List of Concession Powers of Federation and State
Most public among the public infrastructure by the tier of Government For full constitute, please refer to:
ion_en
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Definition and Classification of Roads
According to the Public Roads Act, 2013 (2076) the term road means a route that is used by vehicular traffic for transport of goods and persons, and the term road includes all kinds of bridges, overpasses, underpasses, subways, viaducts, overpasses, subways and underpasses.
Four types of roads:.
- Roads that are used by vehicles for transport of goods and persons
- Roads that are used by vehicles for transport of goods
- Roads that are used by vehicles for transport of persons
- Roads that are used by vehicles for transport of goods and persons

Definition and Classification of Roads
- Rural Roads: Roads that are used by vehicles for transport of goods and persons
- Urban Roads: Roads that are used by vehicles for transport of goods and persons
- Provincial Roads: Roads that are used by vehicles for transport of goods and persons

Status of Roads as of 2019 (source: DoLi)

- Total length of Provincial level roads: 17,764 km
- Total length of Provincial level roads: 44,352 km
- Total length of Provincial level roads: 6,729 km
- Total length of Provincial level roads: 3,719 km
- Total length of Provincial level roads: 4,315 km
- Total length of Provincial level roads: 2,513 km
- Total length of Provincial level roads: 1,152 km
- Total length of Provincial level roads: 660 km
- Total length of Provincial level roads: 20 km
- Total length of Provincial level roads: 13 km
- Total length of Provincial level roads: 10 km
- Total length of Provincial level roads: 5 km
- Total length of Provincial level roads: 3 km
- Total length of Provincial level roads: 2 km
- Total length of Provincial level roads: 1 km

Provincial wise Road status, an opportunity for ROW Utilisation

<table>
<thead>
<tr>
<th>Province</th>
<th>Provincial Roads</th>
<th>Provincial Roads</th>
<th>Provincial Roads</th>
<th>Provincial Roads</th>
<th>Provincial Roads</th>
<th>Provincial Roads</th>
<th>Provincial Roads</th>
<th>Total Length</th>
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<tbody>
<tr>
<td>1 Federal</td>
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<tr>
<td>2 Provincial</td>
<td>5,508</td>
<td>1,891</td>
<td>3,153</td>
<td>2,991</td>
<td>13,453</td>
<td>11,556</td>
<td>5,891</td>
<td>43,927</td>
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<tr>
<td>3 Local</td>
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</tr>
</tbody>
</table>
Module 3

Module 3: Site and Plant Selection

Hari Gurung
Social Mobilisation Specialist
HELVETAS Nepal

ReCAP
HELVETAS

Steps in Coordination with the Concerned Stakeholders
- Coordination with DOLI
- Coordination with District Technical Office and State Ministry of Infrastructure
- Coordination with concerned Municipalities
- Coordination with concerned Beneficiary Groups

Site and Plant Selection
- Coordination with concerned stakeholders
- Develop site selection criteria with concerned stakeholders
- Develop plant selection criteria with concerned stakeholders

Site Selection Criteria
- Select pilot site from Palika having sole authority and homogeneous society
- Select site having multi-stakeholders engagements in Palika
- Sites representing different geography and altitude (for research only)
- The selected site must be thoroughly supported by the Municipality
- It must be possible to clearly demonstrate the right of war at the pilot site – national or other disputes
- There must be no or minimal possibility of road expansion and widening in the foreseeable future for the selected road

Plant Selection Criteria
- Undertake discussions on plant selection with the concerned stakeholders:
  - District Agriculture Office and Agriculture Knowledge Centre,
  - The local Forestry and Soil Conservation Officers,
  - The concerned Palika,
  - The beneficiary households.

Module 4

Module 4: Detailed Survey of Selected Site

Ram Sharan Adhikari
Civil Engineer
HELVETAS Nepal

ReCAP
HELVETAS

Detailed Survey of the Selected Site
- An in-depth survey of the selected site has the following components:
  1. A sketch plan of the selected site, showing all relevant information, the final geometry of the road, and all information about the road's design.
  2. A geological report that includes topographic survey results.
  3. A detailed survey of the road's surface and the surrounding area.
  4. A detailed survey of the road's cross-sections.
  5. A detailed survey of the road's alignment.
  6. A detailed survey of the road's subgrade.
  7. A detailed survey of the road's pavement.
Bio-engineering
Aspects to Consider:
- Important concepts in Bioengineering
- Important concepts in Engineering
- Civil engineering vs. Bio-engineering - by graph the mechanical & hydrological functions of plants
- Cost effectiveness of field designs
- Limitations

Preparatory Work - Health and Safety Issues
- During the first surveys of the area, make sure that a study is undertaken to assess the possible risks to safety during field implementation of both engineering and plantation works.
- Ensure that the necessary health and safety equipment is listed and collected before field work begins.
- Ensure that the site managers and the IRG know where the course first aid camp, health centre, hospital, and ambulance service are, and that contact numbers are recorded.

Desk Study of Selected Road
- Some of the aspects to consider in the desk study and the overall design of the project include:
  - What is the category of road?
  - What is the road width?
  - Is the right of way free of obstacles and suitable for a plantation?
  - What is the status of the road and ROW surface?
  - What is the traffic forecast for that road?
  - What are the risks or potential for road widening in the future?
  - Are there any water management issues to take into account during the design?

Preparatory Works - Formats & Logistics
- Development of a checklist - what to do, when, by and with whom.
- Development of a format for site data collection.
- Develop description of roles and responsibilities for all staff and offices involved in the project - who will undertake vegetation clearing, horizontal alignment, field measurement, social mobilization, etc.
- Collect tools and equipment for site development - measuring tape, GPS, ranging rod and staff, slide, knife, paper, maps, necessary tools for plantation establishment, etc.

Site Activities
- Consultation with local stakeholders, and definition of responsibilities of different parties.
- Collection of data to prepare the site section of the road.
- Undertake survey to collect details of alignment and prepare plan of road and ROW.
- Assess the land condition of ROW across including surface state and soil type, as well as the aspect, moisture condition, and steepness.
- Collect data on the cropping pattern in nearby fields.
- Prepare a list of available plant species at the site.

Criteria for Selection of Plant Species
- Ensure that the following factors are taken into account during selection of plant type:
  - Site suitability
  - Potential value to local farmers
  - Availability of planting materials
  - Biological and social considerations
  - Factors concerning ease of establishment, likely potential for good growth, and longer term considerations
  - Methods of plantation establishment and ease of propagation.
Module 5:

**Cost Estimates of Any Required Civil Design Structures**

During the cost estimate ensure that you:
- Consider the need for any civil engineering structures - e.g., for slope stabilization, side drains, check walls, toe walls, revetment walls, retaining wall etc.
- Consider the status of the slope, its stability, any trimming needs, structures and designs for safe water disposal, and management of excess earth mass.

**Design and Cost Estimate of Bio-engineering Structures**

Ensure that the cost estimate considers:
- A full calculation of bio-engineering items based on the design - for example, the number of plants or seeds required, jute netting if needed, live stems for brush layering and need for fencing materials;
- The availability of planting materials, the location, the cost at the nurseries, and costs of transportation, of plantation establishment, of weeding and maintenance, of irrigation provision etc.

**Outline of Module**

Formation and Mobilization of Road Users Committee

- Programme planning and preparation
- Programme implementation
- Programme monitoring and evaluation

**Programme Planning and Preparation**

- Interaction with concerned stakeholders at Provincial and Local Government level
- Palika to select local road network for implementation
- Ranking of roads for flow planning
- Committee formation for implementation

**Programme Planning & Preparation cont.**

Develop the institutional set up at the local level:
- Identification of beneficiary communities
- Conduct mass public meeting
- Provide description of the project and sharing of objectives
- Formation of the User Group and the inclusive management committee
- Orientation on decision making process and its documentation
- Preparation and endorsement of bye-laws
- Group registration
- Preparation of the project proposal
- Opening of a bank account

**Project Implementation**

- Develop a training needs assessment
- Undertake capacity building activities
- Prepare an agreement with the Municipality and/or Province (refer sample agreement
- Selection of experienced local mobilizers
- Undertake and document a baseline study of the beneficiaries
- Provide the following training:
  - Leadership and definition of roles and responsibilities
  - Business plan preparation
  - Establishment of a financial statement
- Mobilize User Group to collect construction materials
- Mobilize User Group and community to undertake: site preparation, construction, regular maintenance, activities to include the following with ex-situ practical training
  - Site clearance and preparation
  - Sowing, Preparation, and seed collection
  - Water management, including initial land preparation and moisture
  - Harvesting, including weeding, harvesting, crop monitoring, and irrigation

**Project Implementation cont.**

- Reporting and administrative tasks
- Harvesting, processing, and marketing of products
Module 6

Site Preparation and Plantation

Ram Sharma Adhikari
Civil Engineer
Helvetas Nepal

Planning of the Works
This will include:
- work activity planning against a timeline
- human resource planning with the RUG who is responsible for what task and when
- fund management including responsibilities for handling the cash and paying the bills
- plant management including responsibilities for purchase, payment, delivery, and sale storage

Preparations for Fencing
Please be aware that fencing may not be required, but:
- fencing is needed to protect the plants from roaming cattle

Please note:
- fencing should be installed before any planting is undertaken;
- as far as possible, local materials like live stems or bamboo, or shrubs should be used;
- live stems may be the best option as cuttings can be used for fodder or compost preparation depending on species.

Contents of Module
- Planning of the works
- Construction of civil engineering structures
- Preparations for fencing
- Provision for irrigation
- Layout and land preparation for plantation
- Establishing the plantation

Construction of Civil Structures
The minimum civil engineering structures must be in place at the site before plantation in order to:
- prevent soil erosion;
- protect the slopes;
- ensure safe disposal of water;

The following activities must be completed prior to plantation:
- road widening programmes;
- drainage of water;
- construction of terraces;
- construction of the end wall;
- removal of all spoil materials.

Provision for Irrigation
- The need for irrigation water needs to be evaluated and assessed - it depends in the time of planting but in some cases will be needed to counteract the potentially long droughts at certain times of the year.
- If deemed necessary, irrigation water should be:
- stored in advance of the need;
- cost effective;
- sourced nearby from a local house tap, spring, drainage water, shallow boring etc.;
- stored in advance of the time of need in a suitably cost effective manner.
Module 7

Plant Maintenance, Composting and Harvesting

Main Aspects of Plant Maintenance

- Fencing to protect plants from free grazing animals
- Weeding
- Mulching
- Composting
- Harvesting

Fencing

- Fencing is required around the plantation to protect the growing plants from free grazing cattle and goats which will damage the crops.
- Fencing must be established before plantation establishment.
- Low-cost fencing is encouraged using local materials - for example, thorny scrub or banana leaves.
- It is important for the user to keep the fence, and observe the condition of the fence on a regular basis.
- The basin group must ensure that the fencing is properly maintained and repaired when required.
- Communities living near the plantation need to be encouraged to still feed their livestock to avoid damage to the growing crop from free grazing animals.

Harvesting

The example of a Broom grass crop on the ReW area is discussed here.

- Broom grass starts flowering and produces panicles after two years.
- Highest yields are obtained from 3rd to 4th harvest, but yields gradually decline after the 6th year.
- Flowers mature for harvesting from January to March.
- When mature, the panicles change color to light green, or red.
- Panicles should be carefully pulled off the plant, or the panicle with the stem can be cut just above ground level; the panicle is then separated from stem.

Establishing the Plantation

- Establishing the plantation is generally best carried out in the middle of summer to coincide with the monsoon.
- This frequent rains then provide sufficient moisture for the plants to properly establish, and this avoids the need for irrigation - which can be a major cost-saving.
- However, establishing the plantation in the pre-monsoon or monsoon is not always possible, and this depends on both the plant type, and the timing of the program.
- Great care should be taken during the planting, and field managers need to ensure that the correct spacing rate is used, and that seeds, seedlings and saplings are handled with due care, and planted at the correct depth and spacing.

Processing, Marketing, and Other Uses

- The panicles are dried in the sun after harvesting.
- When thoroughly air-dried, panicles can be directly sold or brooms can be made and soiled - this is to be encouraged to provide a small household industry and added income for the community.
- Grading of dried panicles is conducted based on the panicle's length and size.
- Broom grass has multiple uses - the panicles are used for making brooms used in all houses in Nepal, the green leafy parts are used as livestock fodder, and the dried stem is used for fuel, as well as in the paper or pulp industries.
Module 8

**Value Chain Development**
For optimal return from the plantation crop, the following need to be considered:

- Input suppliers: ensure good quality seeds and saplings, good seedling preparation, correct spacing, and correct compost and/or manure additions.
- Producers: ensure sound leadership, quality production, the use of the right technology, proper grading and processing, and good marketing skills.
- Collectors: whole seller/wholesaler ensure good product quality in sufficient quantity, regular supply to attract a good price, and sound networking skills.
- Consumer: ensure the product is of an acceptable design and quality for the end-consumer.
- Information: ensure that the person responsible for marketing has all the correct and up-to-date information - the User Group has the right to good market information.

---

**Value Additions**
- Value can be added to the Broom Grass harvest by processing and making best use of the whole plant and product.
- For example, broom making, and using the straw for paper making, making of climbing vegetables, and composting.
- For maximum income, an analysis of the existing value chain of Broom Grass needs to be undertaken with the User Group, considering any constraints and risks as well as the sustainability of the value chain.
- During this analysis process, interactions with the chain actors, the capacities of the User Group are strengthened.

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**Enhancing an Enabling Market Environment**
- Develop informal rules and regulations to ensure a friendly environment for marketing of the commodity.
- Encourage the Local Government to create an enabling environment for marketing, with appropriate and easy to understand policies, rules and regulations, institutional support, development of good market infrastructure, and a sound pricing strategy.
- Ensure an improving private sector engagement in the selected value chain through awareness campaigns, publicity, and free transfer of information.

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Module 9

**Content**
- Training evaluation
  - Module wise knowledge test questionnaires
  - Collection of feedbacks
  - Documentation
Thank you for your attention
Annex 4  Questionnaires for Self-Assessment by Module

PARTICIPATORY APPROACH FOR ROADSIDE PROTECTION OF RURAL ROADS IN NEPAL

Web-based E-learning training course

6-25 May 2020

Questions for Self-assessment on Right of Way Utilisation Training Course

Module 1

- 

Module 2

Q.1: According to the Constitution of Nepal 2072, how many local levels are provisioned?
A) 532  B) 761  C) 753

Answer: C) 753

Q.2: In which year was the Public Road Act formulated?
A) 2030  B) 2031  C) 2032

Answer: B) 2031

Q.3: According to the Constitution of Nepal 2072, which levels of the Government’s federal structure can define the Right of Way of Local roads in their policy?
A) The Federal Government  B) The Provincial and & Local Level Government  C) Local Level Government

Answer: C) Local Level Government

Q.4: What is the approximate total length of the road network as of 2019 in Nepal?
A) 50,500 Km  B) 75,200 Km  C) 61,395 Km

Answer: C) 61,395 Km

Module 3:

Q.5: Which levels of Government can formulate the rules concerning the utilisation of the Right of Way at local level?

Answer: C) The related Local Level of Government

Q.6: Which group is the target at the local level for engagement in the utilisation of the Right of Way?
A) The economically disadvantaged  B) The socially disadvantaged  C) Both socially and economically disadvantaged

Answer: a) The economically disadvantaged

Q.7: What is the main objective of the Right of Way Utilisation?
A) Protection of steeper slopes, road security, and providing livelihood options for disadvantaged communities
B) Infrastructure development
C) Maintenance of the road by the user group
Answer: A) Protection of steeper slopes, road security, and providing livelihood options for disadvantaged communities

Q.8: Who is entitled to use the land under Right of Way utilisation scheme at local level?

A) The related local level Government  B) The Users’ Group  C) The Provincial Government

Answer: A) The relevant local level Government

**Module 4:**

Q.9: What is your understanding about health and safety equipment?

A) Quality construction and tools
B) Personal safety equipment (gloves, boots, goggles, helmets etc.)
C) First Aid box

Answer: B) Personal safety equipment (gloves, boots, goggles, helmets etc.)

Q.10: Is there need to do a technical survey and a lay out drawing and design when making a Right of Way utilisation plan?

A) Yes  B) No  C) follow the decision of the local level Government

Answer: A) Yes

**Module 5:**

Q.11: What will be the composition of a Road User Group and the related Committees?

A) Inclusive  B) Advantaged people only  C) Only women

Answer: A) Inclusive

Q.12: Where does a Road User Group legally register itself?

A) At the Local Level Government Offices  B) The Agriculture Knowledge Centre  C) The District Administration Office

Answer: A) At the Local Level Government Offices

Q.13: The income/benefits from the Utilisation of Right of Way needs to be shared between which of the following bodies?

A) The Road Maintenance Committee  B) The Local Level Government  C) The Provincial Government

Answer: B) The Local Level Government

**Module 6**

Q.14: What activities are carried out at the programme site preparation stage?

A) Action plan preparation, infrastructure development, fencing, irrigation management
B) Social mobilization, fund management, plant management
C) All of the above

Answer: C) All of the above
Q.15: Why is fencing required before plantation of plant?
A) To protect from roaming cattle  B) To protect from wild animals  C) To protect from thieves
Answer: A) To protect from roaming cattle

Module 7

Q.18: What are the basic criteria for the selection of plants?
A) Local climate friendly, and need a minimum of water to survive
B) More economically beneficial, and easy to sell the product in the local market
C) All of the above
Answer C) All of the above

Q.19: How many times is weeding necessary after establishing the plantation and planting the seedlings or saplings?
A) 1-2 times in a year  B) 2-3 times in a year  C) 5-6 times in a year
Answer: B) 2-3 times in a year

Module 8

Q.20: Who are the value chain actors?
A) Traders and consumers
B) Input suppliers, producers, traders and consumers
C) Input suppliers and producers
Answer: B) Input suppliers, producers, traders and consumers

Q.21: Whose efforts are needed for the development of a market system?
A) The private sector  B) Both public and private sectors  C) The public sector
Answer: B) Both public and private sectors

Module 9

Q.22: How useful are the contents of this training?
A) Very Useful  B) Useful  C) Not useful
Q.23: What subjects can be added to the training content to make it better?

Q.24: How effective did you find the web-based training mode?
A) Very effective  B) Effective  C) Not effective

Q.25: What are your suggestions for further improvement of this training?

…………………………………………………………………………………………………………………………………………………………
### Annex 5  On-Line Evaluation of Training Course

<table>
<thead>
<tr>
<th>How useful are the contents of this training?</th>
<th>What subjects can be added to the training content to make it better?</th>
<th>How effective did you find the web-based training mode?</th>
<th>What are your suggestions for further improvement of this training?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Useful</td>
<td>Other items as well</td>
<td>Very effective</td>
<td>Try to make it much more friendly</td>
</tr>
<tr>
<td>Useful</td>
<td>Making user commitee by us (prabidhik)? role of whom is what? not clearly explained here!</td>
<td>Effective</td>
<td>Conduct similar training on other topics too</td>
</tr>
<tr>
<td>Useful</td>
<td>How the technician of every level can contribute to implement bio-engineering in their workplace?</td>
<td>Effective</td>
<td>It would be better if the questions are more in number regarding the module.</td>
</tr>
<tr>
<td>Very Useful</td>
<td>Some international practices</td>
<td>Effective</td>
<td>Some video session</td>
</tr>
<tr>
<td>Very Useful</td>
<td>Detail of soil</td>
<td>Very effective</td>
<td>Data reference should be included</td>
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<tr>
<td>Useful</td>
<td></td>
<td>Effective</td>
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<tr>
<td>Very Useful</td>
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<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td>N/A</td>
<td>Effective</td>
<td>N/A</td>
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<tr>
<td>Very Useful</td>
<td></td>
<td>Effective</td>
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<tr>
<td>How useful are the contents of this training?</td>
<td>What subjects can be added to the training content to make it better?</td>
<td>How effective did you find the web-based training mode?</td>
<td>What are your suggestions for further improvement of this training?</td>
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<tr>
<td>Useful</td>
<td>Techniques of Bio-engineering</td>
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<td>Questions should be made even strictly as per the module.</td>
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<td>Very Useful</td>
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<td>Effective</td>
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<td>Effective</td>
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<tr>
<td>Very Useful</td>
<td>Training in road sector and its component</td>
<td>Very effective</td>
<td>Relevant figure can be attached in powerpoint</td>
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<tr>
<td>Useful</td>
<td></td>
<td>Very effective</td>
<td>I think technical content should be added. about details of civil structure which used in RoW in hill road should be added.</td>
</tr>
<tr>
<td>Very Useful</td>
<td></td>
<td>Very effective</td>
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<tr>
<td>How useful are the contents of this training?</td>
<td>What subjects can be added to the training content to make it better?</td>
<td>How effective did you find the web-based training mode?</td>
<td>What are your suggestions for further improvement of this training?</td>
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</tr>
<tr>
<td>Very Useful</td>
<td>How road slope is protected?</td>
<td>Very effective</td>
<td>I think this research serves the purpose as right of way utilisation and roadside protection. I found the analysis regarding the right of way utilisation in one road but didn’t found the analysis regarding the roadside protection. It will be easier to replicate this research to another road section and it will provide the ground to convenience the concern authority how it serves for the both purposes, so the manual must contain both the matter. Another thing, is that from the economic analysis of one very short section of road, how can we conclude that that utilisation of RoW generates incomes always. So, it will be better to put few more analyses. The institutional set up for RoW protection seems to be too much bulky.</td>
</tr>
<tr>
<td>Useful</td>
<td>Lacking to show some example</td>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Very Useful</td>
<td>Short topic related videos are also include.</td>
<td>Very effective</td>
<td>This type of online courses need to include the visual class.</td>
</tr>
<tr>
<td>Useful</td>
<td></td>
<td>Effective</td>
<td>More effective if related videos will be there</td>
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<tr>
<td>Very Useful</td>
<td></td>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Very Useful</td>
<td>Road structure</td>
<td>Effective</td>
<td>Such type of training is required next time</td>
</tr>
<tr>
<td>Very Useful</td>
<td>Water harvest</td>
<td>Very effective</td>
<td>More survey topics can be included</td>
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<tr>
<td>How useful are the contents of this training?</td>
<td>What subjects can be added to the training content to make it better?</td>
<td>How effective did you find the web-based training mode?</td>
<td>What are your suggestions for further improvement of this training?</td>
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<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Useful</td>
<td>Types of plants species, and actual example in practice with photos and videos.......</td>
<td>Effective</td>
<td>More examples More photographs More videos More information with mathematical calculation of cost, benefits.......</td>
</tr>
<tr>
<td>Useful</td>
<td>Local Level Acts</td>
<td>Effective</td>
<td>This type training is repeated on local level staff</td>
</tr>
<tr>
<td>Very Useful</td>
<td></td>
<td>Very effective</td>
<td></td>
</tr>
<tr>
<td>Very Useful</td>
<td></td>
<td>Very effective</td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td>Specify some progress reports if already have been made.</td>
<td>Effective</td>
<td>Provide some visual materials also so that a person can better understand within short period.</td>
</tr>
<tr>
<td>Useful</td>
<td>Hazards</td>
<td>Effective</td>
<td>It would be better if someone had explained it</td>
</tr>
<tr>
<td>Useful</td>
<td>Selection of Plant, Practical Session for stakeholder</td>
<td>Very effective</td>
<td>Content should be clearly described rather than a slide.</td>
</tr>
<tr>
<td>How useful are the contents of this training?</td>
<td>What subjects can be added to the training content to make it better?</td>
<td>How effective did you find the web-based training mode?</td>
<td>What are your suggestions for further improvement of this training?</td>
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</tr>
<tr>
<td>Useful</td>
<td>I believe this training was useful for hilly sector. As I am working in Terai area, the course content should cover some slides about Terai regions.</td>
<td>Very effective</td>
<td></td>
</tr>
<tr>
<td>Very Useful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td>Related to civil engineering</td>
<td>Very effective</td>
<td>Practical training will be better</td>
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<td>Useful</td>
<td>Infrastructure development after COVID-19 in rural areas. Possibilities and Challenges</td>
<td>Very effective</td>
<td>The training was useful. For the improvement of the training other challenges of rural developments other than road sectorsshhas to be addressed for the training purposes in future.</td>
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<tr>
<td>Very Useful</td>
<td>Conflict management in right of way</td>
<td>Very effective</td>
<td>Need more mcqs</td>
</tr>
<tr>
<td>Very Useful</td>
<td>Road structural components and their uses</td>
<td></td>
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</tr>
<tr>
<td>How useful are the contents of this training?</td>
<td>What subjects can be added to the training content to make it better?</td>
<td>How effective did you find the web-based training mode?</td>
<td>What are your suggestions for further improvement of this training?</td>
</tr>
<tr>
<td>---------------------------------------------</td>
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<tr>
<td>Useful</td>
<td>species of plants that are particularly effective for given location, altitude and area including season of plantation. that helps the technicians to develop a general idea on plant selection on required part of country</td>
<td>Effective</td>
<td>Training is general, make it specific based on Nepal</td>
</tr>
<tr>
<td>Very Useful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Useful</td>
<td>Detailed instruction to fix ROW in local level road &amp; amp; building by law in terai area.</td>
<td>Effective</td>
<td>Training with voice not only mute slides.</td>
</tr>
<tr>
<td>Very Useful</td>
<td>Aspects of Design for Slope Protection in areas with Slurry deposits and heavy landslide affected areas.</td>
<td>Effective</td>
<td>Overall experience was good. The information was good and very useful to summarize.</td>
</tr>
<tr>
<td>Very Useful</td>
<td>Plant need assessment and basic rate analysis of bioengineering species along with some cost effective slope protection measures.</td>
<td>Very effective</td>
<td>Some E-manuals regarding RoWs and Bioengineering procedure at the end of training would be advantageous.</td>
</tr>
</tbody>
</table>

**NEP2071D Training Report**
<table>
<thead>
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<tbody>
<tr>
<td>Useful</td>
<td>More about RoW</td>
<td></td>
<td>Beside online training better to live training</td>
</tr>
<tr>
<td>Useful</td>
<td>Hill roads design and quality control</td>
<td>Effective</td>
<td>If we get video about each module explanation it will be very effective</td>
</tr>
<tr>
<td>Very Useful</td>
<td></td>
<td>Very effective</td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td>More about Nursery Management, Guidelines for preparing Cost Estimates</td>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td>How can we overcome the problem of creating Right of Way on already developed areas?</td>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Very Useful</td>
<td>Details process to acquire the right of way</td>
<td>Effective</td>
<td>Some video clips on the advantage of the right of way of roads</td>
</tr>
<tr>
<td>Very Useful</td>
<td></td>
<td>Effective</td>
<td></td>
</tr>
</tbody>
</table>