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Pilot Study to Investigate a Participatory Approach for Roadside Protection of Rural Roads in Nepal

Final Pilot Study Report

HELVETAS Swiss Intercooperation Nepal

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Cover photo: Pilot study site 2 near Goganbote area of Marga, Dhankuta, Nepal

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Abstract

This report presents the findings from a three-year pilot study (July 2017-June 2020) which aimed to develop a participatory approach for roadside protection of rural roads in Nepal through the plantation of cash generating crops along the Right of Way (RoW). The study involved an innovative approach through which ownership was fostered by way of a Memorandum of Understanding and agreements between local authorities and local user groups.

The utilisation of RoW land along the roads of the District Road Core Network for poverty alleviation is a new concept in Nepal. A clear legal provision for this purpose has not been enacted in Nepal to date. However, various policy and legal provisions have been endorsed with regard to plantations and to maintaining greenery along the RoW through the local authorities. From this basis, appropriate legal instruments for the use of the RoW are established. Following investigations on legal, engineering and socio-economic conditions, suitable plants were chosen.

Details of the activities and results of the project are described with key lessons, conclusions and recommendations for scaling-up the pilot approach across the country. In summary, 2.85 ha of RoW in two stretches of a rural road in eastern Nepal was planted with amrisso grass (*Thysanolanea maxima*) by two Road User Groups. The project has demonstrated a successful model of participatory approach to utilisation of the RoW which appears to be socially, environmentally, institutionally, financially and technically viable for replication. However, the long-term economic benefits to users from RoW utilisation and reduced road maintenance need more years for accurate assessment, although the early results tend to indicate positive impacts. For replication of the approach, the local governments should take the lead and address the activity through their own Annual Plans and Budgets.

A RoW Utilisation Manual has been prepared, describing the necessary legal, engineering, bio-engineering and economic aspects. In addition, training was held for municipal engineers. Originally foreseen in the form of a face-to-face training workshop, the modality of training had to be converted into a virtual course due to travel restrictions within Nepal imposed as a consequence of the Covid-19 pandemic. In the end, over 200 persons enrolled on the course, and 73 completed it successfully, allowing them to print out a certificate of course completion.

An additional document produced during the project is a Procedural Manual for Local Roads Governance in Nepal which aims to build capacity amongst elected Local Government representatives on deliberative processes for decision-making and apply these to the road sector of Local Government. The Procedural Manual was funded externally of ReCAP.

This pilot study report describes the five phases of the project: the start-up, the preparatory activities, the implementation (plantation and training activities), monitoring, maintenance and harvesting of the plantation, and finally the pilot study documentation on completion.

Keywords

Baseline survey, capacity building, training, plant growth, Right of Way, manual, municipalities, Road User Groups, institutional development, roadside protection, participatory approach, bioengineering, plantation, productive use, cost benefit analysis, market chain

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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.

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Acronyms, Units and Currencies

Amrisso	Engl. Broom grass (*Thysanolaena maxima*)
B/C	Benefit Cost Ratio
BSS	Bikram Sambat (Nepali date)
CBO	Community-based Organisation
CFD	Community Forest Division
CFUG	Community Forestry User Group
CIP	Community Irrigation Project
DCC	District Coordination Committee
DFID	Department for International Development
DFO	District Forest Office
DG	Director General
DoA	Department of Agriculture
DoF	Department of Forest
DoLI	Department of Local Infrastructure
DoLIDAR	Department of Local Development and Agricultural Roads
DoR	Department of Roads
DPR	Detailed Project Report
DRCN	District Road Core Network
DRILP	District Decentralised Rural Infrastructure and Livelihood Project
DSCO	District Soil Conservation Office
DSCWM	Department of Soil Conservation and Watershed Management
DTMP	District Transport Master Plan
DTO	District Technical Office
DWSS	Department of Water Supply and Sanitation
EA	Electricity Act
EFLG	Environment Friendly Local Governance
EIA	Environmental Impact Assessment
EPR	Environmental Protection Regulation
ESMF	Environmental and Social Management Framework
FA	Financial Analyst
GoN	Government of Nepal
HH	Household
ICIMOD	International Center for Integrated Mountain Development
IEE	Initial Environmental Examination
IGA	Income Generating Activities
IR	Irrigation Regulation
IRR	Internal Rate of Return
IUCN	International Union for Conservation of Nature
LDO	Local Development Officer
LRN	Local Road Network
LRUG	Local Road User Group
LSGA	Local-Self-Governance Act
LUP	Land-Use Policy
MoA	Memorandum of Agreement
MoFAGA	Ministry of Federal Affairs and General Administration
MoFALD	Ministry of Federal Affairs and Local Development
MoFSC	Ministry of Forest and Soil Conservation
MoLD	Ministry of Local Development
MoPPT	Ministry of Physical Planning and Transport

MoU	Memorandum of Understanding
MTR	Mid Term Review
MuAN	Municipality Association of Nepal
NARMIN	National Association of Rural Municipality of Nepal
NRRS	Nepal Rural Road Standards
NPR	Nepalese Rupees
ReCAP	Research for Community Access Partnership
Ropani	Area of Land (1 ha = 20 Ropani, = 10'000 m²)
RoW	Right of Way
RUC	Road Users Committee
RUG	Road Users Group
SDE	Senior Divisional Engineer
SWOT	Strength, Weakness, Opportunities and Threats
TDA	Town Development Act
ToR	Terms of Reference
US$	United States Dollar (US$ 1.00 ≈ 108 NPR)
VPD	Vehicles per Day

Executive Summary

The objectives of this research project '***A Participatory Approach for Roadside Protection of Rural Roads in Nepal' (NEP2071)***', were to analyse, test and document bio-engineering methods through the utilisation of the Right of Way (RoW) area of rural roads by local communities. The RoW, which by regulation measures 20 metres in width (or 10 metres on either side of the road's central line) can be utilised for productive plantations, generating income for local communities (especially poorer households) as well as providing effective roadside stabilisation and protection (particularly on steeper roadside slopes). It is estimated that about 21,000 ha of land in Nepal could potentially be managed by communities in this way

The project followed on from an earlier Phase (2016-17) that investigated and identified appropriate economically interesting species for testing in the Terai and in the mid-hills. Two potential sites for testing were identified, one along the Sukkhad - Bhajani road in the Terai (Kailali district), and the other along the Hile - Chhintang-Jyamire Bhanjyang road in the mid-hills (Dhankuta District).

The project was initiated in the period immediately after a major reshaping of Nepal's political and administrative structure resulting from the Federal Constitution in 2015. Elections in 2017 brought in new political representatives at all three levels of government: Federal, Provincial and Local. The year 2017 also marked the beginning of the implementation of new roles and responsibilities for these types of government with rights and responsibilities for road construction and maintenance becoming the municipalities each under an elected Local Government.

The project established 2 pilot sites – both located in Dhankuta District since the proposed site selected in Kailali District became unfeasible as a result of the Local Government wishing to upgrade this road (and thus the RoW would become affected by widening) and by the perception that RoW utilisation would be difficult at this site due to heavy grazing pressure.

Project activities continued from 2018-2020 with initial discussions with key stakeholders; baseline studies of 52 households; establishment and capacity development for two Road User Groups (RUGs); site preparation and plantation establishment of *amrisso* (*Thysanolaena maxima*) or broom grass in 2.86 hectares of RoW land. This is a tall grass species well known in Nepal for making brooms and as a fodder species. After plantation establishment, the project team continued with capacity development of two RUGs including training on broom making; markets and marketing; production technology; weeding; irrigation and composting; financial literacy including financial management, business planning, income generation, simple accounting; savings and credit; and other institutional development activities such as formulation of by-laws, the process for registering an organisation, and opening and managing a bank account. Regular site monitoring continued during the project period as well as two knowledge sharing workshops where project-related issues and findings were shared with a wider group of stakeholders from the local community and from Local, Provincial and Federal Governments. During these workshops a number of key legal, financial, technical and institutional issues were discussed leading to further project-initiated actions. The project mid-term review, (not a ReCAP funded activity) which was conducted in 2019, also led to a series of recommended actions for further project implementation and support.

The project ended in June 2020 with the following key outputs (results):

i. Two established pilot sites alongside 3,100 m of rural road in which 14,150 broom grass plants were planted in the RoW extending to either side of the road. Additional 1,941 plants were replanted to compensate for losses due to road widening and mortality in the following season after the first plantation. Each pilot site is under the management of a legally established RUG which undertook to protect and manage the site and to utilise the plantations for the benefit of group members and according to benefit-sharing agreements

with the Local Government (since the RoW land is legally under the municipality's ownership).

ii. Two RUGs legally established and registered with their municipality to manage the pilot sites and with their capacities developed through a series of capacity building events including: plantation site preparation, fencing, planting, irrigation, plant maintenance. The latter was co-funded by the community. The first yield of amrisso was harvested in 2019 and is yet to bloom in the upcoming harvesting season in 2020. The discounted Cost-Benefit ratio, and IRR for 2030 is 2.81 and 44% respectively proving it a viable intervention for scaling up.

iii. Two knowledge-sharing workshops held in Dhankuta and Janakpur (Provincial Capital) to disseminate project lessons more widely and to get feedback and suggestions from key stakeholders.

iv. A Right of Way Utilisation Manual consisting of an updated and revised version of the previous manual (prepared by the earlier project) including the newer procedures and regulations relating to RoW utilisation and based on the technical and institutional lessons and experiences of the project.

v. A set of training materials on RoW utilisation targeted at technical staff from Local Government Roads Divisions/Sections. Since the Covid-19 crisis in early 2020 prevented face-to-face training, an online training (e-learning) for municipal technical staff was developed, covering nine modules with a certificate on successful completion. Over 200 individuals enrolled onto the course, with 73 completing it successfully to gain a certificate. Considering the poor internet quality in some municipalities, this is considered an exceptionally good result.

vi. A Procedural Manual on Local Roads Governance for Nepal (as recommended by the mid-term review) aimed primarily at elected representatives of Local Government and focusing on deliberative decision-making on: strategic planning; annual planning and budgeting; sector planning; project planning (detailed project report preparation); procurement and construction and monitoring for local roads.

Key findings and lessons from the project are described in Chapter 6 of this report. These include:

- That focusing largely on the technical and participatory aspects of local communities (as originally planned) would not have been successful had the wider governance and capacity issues of RUGs not also been addressed at the same time
- That pilots should have been undertaken across a wider spectrum of environments (environmental and socio-economic) to properly demonstrate the lessons from technical interventions of RoW utilisation
- That capacity development of RUGs for their self-governance is equally, if not more important than technical capacities to manage the RoW. The institutional capacity building of RUGs will enable them to sustain productive activities after the end of the project with a range of different activities benefitting local people and will give Local Governments the confidence to continue to work with them.
- That capacity development activities are also required for (a) the elected representatives of local governments who have key decision-making roles in planning, budgeting, service delivery and monitoring in all sectors (including rural roads) and (b) the technical staff of municipal roads divisions/sections who may not be familiar with concepts of RUG establishment and support.

- That site-specific planning at a micro-site level is necessary to better take into account differences in soils, drainage, environmental conditions and also levels of biotic pressure (grazing). Detailed site planning with a range of interventions is suggested
- That more information on the environmental effects of RoW utilisation, especially the effects on soil erosion, runoff and road maintenance costs. This may prove to be of greater benefit than the immediate socio-economic benefits of the RoW utilisation and contribute to wider uptake of the approach.
- That longer term monitoring at pilot sites to generate better evidence of the economic aspects of RoW utilisation is needed to address the question of economic viability. This would generate more useful information for local decision-makers. Similarly, systematic monitoring information on environmental changes resulting from RoW utilisation is also required for assessment of RoW utilisation benefits.
- That the focus of the project on adding value to amrisso products to create employment and higher cash incomes was critical at the moment where income-earning opportunities in rural areas are few. This includes project emphasis in product marketing.
- That RoW utilisation forms only a small part of the wider picture of rural roads governance and cannot be considered in isolation. A more effective approach is to support planning and decision-making of the whole rural roads sector by Local Governments to ensure that sufficient resources are made available for maintenance of the existing road network.
- That inter-municipality coordination is needed to address rural road maintenance and RoW utilisation issues since there are many rural roads that cross municipal administrative boundaries and jurisdictions.
- That RoW utilisation should form an integral part of roads sector planning from the design stage in a municipality – not an added-on afterthought. This would avoid some issues relating to budget availability for RoW utilisation from Local Governments and would avoid some of the effects of rural road reclassification resulting in loss of planted areas in the RoW as the project has experienced. This aspect has been incorporated in the Procedural Manual on Local Roads Governance.
- That joint monitoring – especially of pilot field sites and through knowledge-sharing workshops has enabled the project's experiences and lessons to be more widely shared than if the monitoring had been conducted by the project team and shared only through written reports. This has allowed the project team to develop better working relationships with different stakeholder groups and has contributed to wider ownership of the project's outputs (manuals, training materials etc) and greater potential for the approach to be replicated.

Conclusions and recommendations arising from the project are described in Chapter 7 of this report in four categories relating to:

- Overall Project Design, Implementation and Replicability
- RoW Utilisation Approach and Viability
- Socio-economic and Environmental Benefits of RoW Utilisation
- Governance and Institutional Aspects of RoW Utilisation

The report concludes that the project has provided a good example of best practice in participatory research for utilisation of the RoW of rural roads by local communities in Nepal. Despite a lack of empirical evidence to demonstrate clear impact of the approach, its approaches, achievements, and learnings have been substantial and will contribute to future training of road engineers and technicians – especially those engaged by Local Governments and also to Local Government elected

representatives themselves as well as for local communities. The documented project outputs (training materials and manuals) provide a highly relevant source of information to promote these approaches. Several recommendations are included – mainly as a means for scaling up the approach and lessons to more municipalities across Nepal.

1 Introduction

1.1 Background

The Research in Community Access Partnership (ReCAP) is a programme of research, capacity building and knowledge dissemination funded by UKAid through the UK Government's Department for International Development (DFID). ReCAP comprises two regional initiatives: the Asian Community Access Partnership (AsCAP) and the Africa Community Access Partnership (AfCAP).

ReCAP promotes safe and sustainable rural access in Sub-Saharan Africa and Asia through research and knowledge sharing between participating countries and the wider community. The aim of the initiative is to build on the programme of high-quality research established under previous DFID programmes and take this forward to a sustainable future in which the results of the research are adopted in practice and influence future policy. The management of ReCAP is contracted by DFID to Cardno Emerging Markets (UK) Ltd through a Programme Management Unit (PMU) alongside the AsCAP and AfCAP Regional Steering Committees.

Through consultations with DoLIDAR (now DoLI), the Pilot Study to Investigate a Participatory Approach for Roadside Protection of Rural Roads in Nepal was identified as a ReCAP project with the objectives of researching into the provision of livelihood opportunities for people living close to the road, building on the access to markets provided by the roads, and thus helping to reduce poverty. At the same time, the plantations within the RoW were expected to provide improved road protection, particularly on steeper roadside slopes. It was anticipated that in this way the participatory utilisation of the RoW areas would achieve the dual aims of poverty reduction and improved road protection.

Helvetas Swiss Intercooperation Nepal (hereinafter referred to as Helvetas) was identified as the service provider though a competitive bidding process. Phase 1 of the Pilot Study (NEP2071A) was conducted from January to April 2016, whilst implementation of Phase 2 (NEP2071D) took place over July 2017 to June 2020. Phase 1 focused on identifying two suitable pilot sites and appropriate plantation species for each. Phase 2 focused on a practical trial at two study sites, the identification of appropriate legal requirements and procedures, and the documentation and dissemination of lessons learned at national level. This included the production of a manual and an online training course on the utilisation of the RoW.

1.2 Context of the Pilot Study

Despite huge investment in rural roads in Nepal, the condition of many has remained unsatisfactory, being only passable during the dry season. Many roads require huge investments in maintenance by Local Governments who have to decide between investing their limited resources on rural roads as well as delivering other important services for local people such as health and education. Key reasons for this include a general failure to effectively plan for rural road development (including future maintenance) and subsequently, a failure to identify and establish a robust and sustainable maintenance approach – including the appropriate use of the RoW land. Much of the RoW has been encroached and is used in ways that trigger soil erosion, landslides and road accidents – increasing Local Government liability and costs. Against this backdrop, identifying a new approach for the sustainable management of the RoW land, linked with prospective income generating activities, was a significant initiative.

The initial pilot study took place over a period of major political and administrative restructuring in Nepal. In 2015, Nepal's government enacted a new Constitution, under which Nepal became a Federal Republic with three tiers of elected government – Local (753 elected Local Governments or municipalities); Provincial (seven elected Provincial Governments); and the one Federal Government based in Kathmandu. The Federal Constitution emerged out of a period of intense conflict, and the devastation caused by a major earthquake in 2015. It is designed to safeguard transparency, accountability and the effectiveness of delivery of basic services to the citizens of Nepal and to uphold a series of fundamental human rights – including the right of all people to benefit from the services of the state.

Staggered elections over 2017 brought in newly elected representatives at all three levels of government. From this point onwards, Local Governments began to function as political and administrative entities, replacing most of the functions of the former districts (of which there are 75 - eventually 77).

The Federal Constitutional structure has several important implications for the roads sector. When this study was originally conceived, it was designed in collaboration with the Department of Local Infrastructure and Agriculture Roads (DoLIDAR), which (as its name implies) was the national body responsible at the time for rural roads. However, under the constitution it is now the (urban and rural) municipalities that are responsible for rural roads. Thus, there are now 753 separate entities across the country making decisions about rural roads. As far as this study is concerned, one result was that the site selected in the Terai had to be dropped in response to municipal request. Instead (as documented in Chapter 2) the research focused on the mid-hills, where municipal interest was stronger; both selected pilot sites were in the mid-hills of Dhankuta of Province 1. Overall, the research had to place greater emphasis on institutional and governance issues, as well as making a far greater effort to reach out to technical staff in all the municipalities across the country rather than to a central government Department.

Greater rural access through rural road construction is one of the chief demands of rural people, as evidenced by a huge increase in rural road construction post 2017. However, with municipalities being only newly established, often, local road planning, construction and management is carried out by elected Local Government representatives and their administrations without due process. This can lead to unnecessary expenditure (especially for future road maintenance), lack of transparency and potentially negative environmental and social impacts. Roles and responsibilities of different local roads stakeholders are often unclear; key stakeholders may only be involved in a superficial manner; the rationale for planning and building new roads is not always clear or agreed; and road planning, design, construction and maintenance lacks transparent technical, economic, environmental, political and social decision-making processes. As a result, many newly constructed roads will prove to be difficult to sustain in future and may result in a considerable cost burden for municipalities.

Whilst the existing Public Roads Act (1974) remains in force until it is replaced by updated legislation, the Provincial Government of Province 1, in which the project area is located, has already drafted a Roads Act for the roads under their jurisdiction (see Chapter 2). This will come into force when passed by the Provincial Assembly and will define and affect the respective responsibilities for all roads and RoWs in the Province according to a new classification. Municipal governments have also already begun to define their road and infrastructure plans and strategies. The former Department of Local Infrastructure and Agriculture Roads (DoLIDAR) has been restructured and renamed as the Department of Local Infrastructure (DoLI) under the Federal Government. It now has a very different role to play regarding rural roads, being focused solely on setting standards and national policies rather than having a direct role in road planning, construction and maintenance.

The context for the pilot study has evolved considerably since the project was initially conceived. From an initial focus on RoW utilisation as a means for benefiting the livelihoods of poor people and for contributing towards rural road maintenance, the importance of considering governance

arrangements and the respective roles of different stakeholders has become imperative. Although continuing to work towards the original stated project objectives, it has also become necessary to engage in a wider sphere of actions that will sustain rural roads maintenance through investigations, piloting, capacity development and planning processes that contribute to rural roads governance more widely.

1.3 Concept of Bio-engineering

The pilot study did not introduce the concept of roadside slope stabilisation through bio-engineering to Nepal. Indeed, it has been a common practice for many years. In Eastern Nepal, it was first practiced along the Dharan - Dhankuta road in 1975 after the UK Government assumed responsibility for the road project. In subsequent years, the practice was also implemented in many other districts and rural road construction projects funded by the Government of Germany under the name of Green Roads. Over the past decade, the Department of Roads (DoR) and the Department of Local Infrastructure (DoLI) have emphasised to bio-engineering practices for roadside slope protection. However, the concept was not fully embedded in national strategies as many bio-engineering works have disappeared due to poor or no maintenance. Neither has importance of species selection and connecting the approach with the livelihoods of local communities been actively emphasised.

Over the last 20 years, much experience has been gained and much research carried out in relation to roadside bioengineering works and their effectiveness. Some of the benefits of bio-engineering are that:

- It stabilises roadside slopes and returns them to a form of natural ecosystem;
- It provides potential complementary income to enhance the livelihoods of local people;
- It improves local capacity to adapt to changing climate conditions

As a result, the international donor community is generally in favour of employing bio-engineering techniques in both road construction and maintenance projects.

1.4 Objectives of the Research

The overall stated aim of the project is to demonstrate that the RoW can be used for reducing poverty and instigating economic prosperity while providing improved protection for road side slopes[1].

As a second phase of a project that started in 2015, this project '*A Participatory Approach for Roadside Protection of Rural Roads in Nepal*' (2017-2020) aimed to implement and build on the recommendations and experiences of the first stage study and prepare the ground for nationwide replication. Specific project objectives are shown in Table 1.

Table 1: Project Objectives

Project Objectives	
i.	To pilot the institutional structures as recommended by the first stage
ii.	To adjust the methodology and manual with the experience of actual implementation
iii.	To devise a basis for revenue sharing among beneficiaries and local governments
iv.	To link roadside plantation with road maintenance and slope protection
Source: Project Reference NEP2071D, Document BII, Terms of Reference	

[1] Project Reference NEP2071D, Document B II, Terms of Reference.

The project's terms of reference state that methodologies and procedures that were developed in the first phase will be tested, that positive and negative outcomes of each step will be recorded and that the draft manual from phase 1 will be revised and refined based on the outcomes from this phase of the project. Chapters 6 and 7 of this report assess the extent to which these objectives have been achieved and present the associated evidence.

A Mid-Term Review (MTR) of the project, although not a specific project milestone, was conducted in 2019 in order to: (i) assess project progress in the changed context of federalisation in Nepal; (ii) identify the project's potential role in supporting and developing rural roads governance; (iii) assess the needs and capacities of the RUGs, the Road Maintenance Committees (RUCs) and local governments to more effectively contribute to rural roads governance; and (iv) identify the potentials and the processes for scaling up the project concept of utilising the RoW. The MTR therefore shifted or increased the project direction towards governance arrangements and capacity for RoW utilisation whilst maintaining the original technical and livelihoods-focused objectives. This change resulted from a more up-to-date analysis of the real needs of Local Governments concerning RoW utilisation coming two years after Local Government elections and as Local Governments and the technical staff of their municipal administrations were coming to terms with their new roles and responsibilities under the constitution. The recommendations of the Mid-term Review and the management response are presented in Annex 5. This shift in emphasis has enabled the project to deliver a wider set of outputs than was initially considered which are a key to expanding the piloted approach more widely for nationwide replication (see also Chapter 5, Contributions to Policy Development).

1.5 Structure of this Report

The report is structured into 7 chapters followed by a list of background references and 10 Annexes containing additional information concerning the project. The report adopts a logical sequence describing how the project was implemented after having defined the original research objectives and how project activities evolved and expanded to respond to the changing context. It then continues by describing the main lessons and conclusions that can be logically derived from the project and the key findings.

Chapter 1 describes the background and the context for the project explaining why it was conducted and what the main objectives were.

Chapter 2 describes the legal and policy framework for RoW Utilisation and rural roads more widely in Nepal including the development of new institutional responsibilities as a result of the Federal Constitution that was passed in 2015.

Chapter 3 covers the project activities at the two pilot sites and with participating communities including field-based actions for establishment of plantations in the RoW as well as for capacity development and institutional support. The activity schedule is attached in Annex 1.

Chapter 4 discusses the economic viability of the project approach to RoW utilisation based on the actual project costs and benefits.

Chapter 5 analyses the project's contribution to policy development for rural roads in Nepal through various sharing workshops, manuals and training.

Chapter 6 summarises the major findings and lessons of the project – relating to both the planned project objectives and additional unplanned achievements.

Chapter 7 presents the overall conclusions of the research with recommendations for further action based on key lessons and findings.

Chapter 8 lists some key references relevant for rural roads in Nepal – not necessarily only for RoW utilisation, but covering all aspects of technical, legal, policy and socio-economic. It is intended that this list will be of benefit for further work concerned with rural roads in Nepal.

Annexes 1-7 provide more detail on specific outputs of the project e.g. list of project activities, baseline information, mid-term review recommendations, legal aspects, cost-benefit analysis and the content of project related training.

2 Legal Standing and Policies on the Utilisation of the Right of Way

The Right of Way (RoW) refers to the land through which a road passes – defined by a specific distance on each side of the road centreline. This land normally belongs to the institution to which the road belongs. In the case of local roads, Nepal's 2015 constitution states that this is the Local Government (i.e. urban or rural municipalities). Utilisation of the RoW refers to the way this land corridor on either side of the road is managed, who is responsible and how any benefits arising from its utilisation are shared.

Although the concept of using the RoW for poverty alleviation and local economic development has existed for some time in Nepal, clear legal provisions for this purpose have not been enacted. The establishment of a federal system in 2015 and the reorganisation of rights and responsibilities between the three levels of government has resulted in different interpretations of policy provisions, especially at local level. Already some Local Governments have individually enacted various policies and legal provisions about establishing plantations along the RoW.

At the time when this research was conceived, it was not anticipated that the federal system would be implemented as quickly as has proved to be the case. Although this has created some problems, the study, coming at the time it did, proved a timely opportunity to promote exchange and a degree of common understanding about the utilisation of the RoW between the 753 local governments across the country. This has been an important outcome.

2.1 Legal Provisions on Utilisation of the RoW

The legal arrangements and land tenure of the RoW and its utilisation are important issues for this pilot project. The constitutional and legal provisions, including regulatory provisions and policy frameworks, were therefore carefully assessed. Analysis of existing legal provisions on the utilisation of the RoW and the legal jurisdiction at the local level revealed consistency between the legal provisions of the Public Roads Act (1974) and the Local Government Operation Act (2017), because both acts delegate the responsibility for the utilisation of the RoW to local levels through local communities. The Local Government Operations Act (2017) specifically delegates authority for construction, maintenance and utilisation of rural roads to the newly established Local Governments.

Various other policy and legal provisions have incorporated policies for plantations in order to maintain greenery in the RoW through the Local Government and with participation of local communities e.g. Howell, (1999), GoN, (2015). The main policy and legal provisions in Nepal for the utilisation of the RoW are as follows:

The Constitution of Nepal (2015): according to the constitutional provisions of Nepal, provincial level roads fall under the jurisdiction of the Provincial Government, while local, rural and agricultural roads fall under the jurisdiction of the Local Government (Art. 57). Forest-related matters e.g. concerning tree planting in the RoW, are included in the concurrent list of powers given in the Constitution http://www.lawcommission.gov.np/en/archives/category/documents/prevailing-law/constitution/constitution-of-nepal

The Land Acquisition Act (1977): According to this act, if land ownership is acquired by the Government of Nepal, or any institution, no person shall construct any building, shed, wall etc., on such land, or cultivate this land without the written approval of the Government of Nepal or the concerned institution. Similarly, in case any person constructs any building, shed, wall, etc., or

cultivates the land in contravention of this provision, the Government of Nepal or the concerned institution may confiscate such structure, or the crop grown on that land, without paying compensation (Sect.32).

The Nepal Rural Road Standards 2055 BS, revised 2071 BS (2015): This standard defines the area of the RoW. According to this standard, the area of the RoW depends on the importance of the respective road and its possible future development. The recommended RoW and building line for various types of district roads in the core network is 20 m, and the setback distance from the road-land boundary/RoW to the building line on either side is 6 m for district roads. In case the existing RoW is wider than the value defined above, the existing available width shall be adopted as RoW. During the utilisation of the RoW by local communities for income generation, they should follow the DoLI District Road Standards, 2014.

The Public Road Act (1974): This Act – which predates the Constitution by many years - states that the Department of Roads (DoR) shall plant trees on the right- and left-hand sides of a public road, as required. The act delegates the duty to take care of and protect the trees planted in the RoW to the concerned VDC (this was prior to federalisation) or municipality. According to this act, the responsibility of the DoR is to trim the trees planted in the RoW and to remove such trees if they obstruct the movement of traffic. The Act further states that the DoR can order any other actions mentioned in this act to be carried out by any other person or organisation as prescribed in the law (Sect.16). If a person roots out or cuts any tree planted in the RoW without permission, such person shall be punished with a fine of up to NPR 2,000 (Sect.30):

http://www.lawcommission.gov.np/en/wp-content/uploads/2018/10/public-roads-act-2031-1974.pdf

The Local Government Operation Act (2017): This act delegates various duties, rights and responsibilities to the Local Governments including for the utilisation of the RoW. Authority for local infrastructure including roads and for formulation, implementation, monitoring, evaluation and regulation of policies, laws, standards and plans related to local, rural and agriculture roads and irrigation lies with the Local Government.

The Town Development Act (1998): The Town Development Committee may classify the land within its jurisdiction for various purposes, and this committee also has the authority to develop plans for the protection or conservation of the roadside land or RoW.

The Environment Protection Regulation (1997): This states that an Initial Environmental Examination (IEE) report must be prepared for the construction of district roads, urban roads, rural roads and small feeder roads. Roadside plantations are an important mitigation measure to address environmental impacts of such roads (DoLIDAR, 2013; DoR 2013).

Irrigation Rules (2000): as well as electricity-related legal instruments these rules also state that the RoW of irrigation channels and the high-tension lines of electricity grids can be utilised by local communities for plantation and poverty alleviation purposes.

2.2 Policy Framework

Various policy documents of the Government of Nepal have made specific provisions for the utilisation of the RoW, as summarised below:

Land Use Policy 2069 BS: The goal of this policy is to develop land-use plans for the utilisation of the RoW of main roads within 5 years of the commencement of this policy. The GoN will promote the maintaining of green belts in the RoW, and these green belts will be conserved and managed by the local government (Strategy 8.4.3). The Forest Policy of 2015 also placed a high emphasis on roadside plantations and implementation of plantation activities on roadsides in order to maintain an environmentally friendly infrastructure is one of the important strategies mentioned in this policy.

The Water Induced Disaster Management Policy (2015): has also made special mention of plantations in the RoW, with the aim of mitigating the risk of landslides and floods. These legal provisions, which apply to the utilisation of riverbeds towards generating income for poor and landless groups, may also be applied to the use of the RoW by poor HHs of local settlements. The GoN has formulated *Directives to provide forest for other purpose (2063 BS) and a Strategy for infrastructure Development and Operation within Protected Areas (2065 BS).* According to these instruments, national priority projects including roads must implement plantation projects in other areas as a compensation for forest loss and must protect these plantations for five years before handing them back to the forest agencies. Such activities can also be implemented through the DFO, or through affected local communities living along the roadsides.

The Poverty Alleviation Fund: Vulnerable Community Development Plan/Operational Manual, (2006): The Poverty Alleviation Fund which is under Government of Nepal, can provide support to vulnerable communities for income generation activities related to poverty alleviation, such as community forestry or the utilisation of the RoW on agricultural roads under multi-community proposals.

Municipal and Provincial Governments have started to formulate their own road sector policies in accordance with their legal mandate. Some municipalities have already developed a road sector policy, but this is generally poorly linked to policies being developed in neighbouring municipalities. Realising this lack of coordination between them, many local governments are awaiting the Province level policy before developing their own. Note that the Transport Master Plan (also a document being developed by some Local Governments) make specific provision for inter-municipality consultation and coordination to address this lack of linkage.

Province 1, the province in which the pilot study sites lie, has already drafted a Road Act which defines the road categories and the Right of Way parameters for roads under its jurisdiction. This draft Act makes provision for three type of roads:

Provincial Highways

- Major links between federal highways and the Indian border South to North
- Major links between two or more than two former district headquarters
- Former feeder roads not falling under the jurisdiction of the Federal Government

Secondary Provincial Highway

- Major links between federal / state highways and connecting urban/rural municipality centres and other major settlement centres
- Major links between federal and state highways to places like airports, hydropower generation centres, major tourist destinations, historical places, international borders and industrial estates
- Bypasses to federal and provincial highways

Provincial Roads (Local, Village/Urban Roads)

- Roads not falling under the above categories that link two municipalities will be managed by the respective municipalities.

The RoW proposed in the draft Provincial Roads Act is defined as follows:

- Provincial Highways: 15 metres from the central line with 3 metre set back
- Secondary Provincial Highway: 12.5 metres from the central line with 3 metre set back

- Provincial roads (Local, Village/Urban): 10 metres from the central line with 1.5 metre set back.

2.3 Tenure Arrangements

The Public Road Act (1974) and the Local Government Operations Act (2017) are the main legal instruments concerning utilisation of the RoW of the District Roads Core Network (DRCN) as well as for other rural roads in Nepal. The constitution of Nepal and the Local Governance Operations Act specify that the owner of the RoW is either the Provincial or the Local Government. Only national highways fall under the Department of Roads. It also specifies that the Local Government or any other institutions or communities should be mobilised for establishment of plantations and their protection in the RoW. In this way, land ownership over the RoW is vested with the Department of Roads and only the use-rights over the RoW can be transferred to Local Governments or local communities based on the contractual arrangements between the Department of Roads/Provincial Government, Local Government and local communities. The tenure-related authority is given to the respective governments (Federal, Provincial and Local Governments).

In conclusion, the pilot study was conducted over a period of intensive policy and legal development at federal, provincial and local levels. Although this occasioned an adaptation of the approach at the pilot study field sites, it also represented an excellent opportunity to contribute to the development of policy and capacities at different levels. Indeed, the workshops, trainings and manual produced through the research served to bring the utilisation of the RoW to the fore in the minds of elected representatives and technical staff when discussing rural road policy, legislation and budgetary expenditure.

2.4 Institutional Mechanisms for RoW Utilisation

The Local Government Operations Act (2017) and the Public Roads Act (1974) provide a basis for the institutional arrangements for coordination, monitoring and implementation of income generation activities in the RoW involving local communities through RUGs. Furthermore, the Public Procurement Act (2063) 3rd Amendment (2075), and the associated Public Procurement Regulations (2064) 8th Amendment (2076), outline the financial procedures that must be followed to enable user groups to be given financial responsibility for roads maintenance activities including RoW utilisation.

These acts and regulations provide an institutional framework for RoW utilisation within the assigned roles and responsibilities of Local and Provincial Governments and their respective Roads Divisions/Sections who have responsibility for different categories of road. Provincial Governments are also preparing their own legislation (Provincial Roads Acts) which will further define the necessary institutional mechanisms and processes. In Province 1, in which the project pilot sites are located, a Provincial Roads Act is still under preparation. In future, Local Governments may also prepare Local Roads Acts covering the roads for which they have jurisdiction.

The project was developed and implemented within a somewhat fluid situation where the respective roles, responsibilities and institutional mechanisms for rural roads and RoW utilisation were still being developed in response to the Constitution and subsequently to the key Local Government Operations Act (2017). Since that time, many aspects of these institutional mechanisms have been clarified but there is still a considerable lack of clarity and understanding amongst different stakeholders regarding these (as was illustrated during the project's Knowledge-sharing workshops). However, implementation of the project during this critical period has enabled some of the project ideas and lessons to become more institutionalised (through training, guidance documents and experience-sharing) in new structures, policies and procedures that are being put in place. It has been particularly important that representatives from DoLI and from the Provincial Government Roads Department have been closely engaged with the project at the time when they themselves have been developing their own legislation, institutional mechanisms, policies and working procedures.

3 Site Activities

3.1 Project Start-Up

A start-up meeting was organised at DoLIDAR on 7 July 2017. It was attended by 26 persons including DoLIDAR staff and other departmental representatives as well as representatives of ReCAP/AsCAP and Helvetas Nepal. Subsequent discussions with DoLIDAR staff stressed the need to organise joint meetings with the district level authorities. At this time is was very unclear exactly how responsibilities for rural roads would be managed. There were strong doubts at federal level over the capacities of municipalities to manage technical aspects of road construction and maintenance.

Preliminary field visits in July-August 2017 to the two pilot sites on the Terai (Kailali) and mid hills (Dhankuta), and discussions with the concerned district technical staff, confirmed the site selection. Preliminary photo and video documents were prepared for further photo monitoring. At this time there was no interaction with municipal authorities as in Dhankuta, they had only just been elected, whilst in Kailali the elections were still to take place.

3.2 Field Level Activities

3.2.1 Interactions with Municipal Authorities

In early 2018 the project team approached the relevant elected Local Government representatives and administrative staff of the municipalities concerned, to discuss the pilot study. It was then that concerns were raised about the suitability of the Sukkhad to Bhajani road site for the pilot research. The elected representatives of Bhajani urban municipality expressed their dismay as they had already included the entire stretch of the road in their road widening plan. In addition, they pointed to the problem of large numbers of roaming stray cattle which were devastating easily accessible plantations and crops. This problem arose from the closing of the Indian border to a previously thriving but informal trade in old and unproductive cattle, destined for the beef market. Militant Hindu politicians had rallied Indian public opinion against this trade, which had effectively ceased.

A letter from the Bhajani municipality Mayor confirmed that the Sukkhad – Bhajani road could not be included in the pilot study. Despite concerted efforts to find an alternative site in the Terai, other municipalities noted the same reservations. They neither wanted to limit their road expansion plans nor to be responsible for damages to plantations caused by voracious stray cattle.

In contrast, the concept of productive use of the RoW met with far greater interest amongst elected representatives of municipalities in Dhankuta in the mid-hills. The mid-hills of Nepal range from 900 to 3,000 m elevation. They comprise steeply sloping river valleys and ridges vegetated by temperate forests. The bedrock in the Dhankuta area is of rather unstable schist and gneiss, prone to landslides. Annual precipitation averages around 1,000mm with over half of this falling in the three monsoon months of June, July and August. In these conditions of heavy rainfall combined with landslide-prone geology, roadside stabilisation becomes an important issue.

3.2.2 Description of Pilot Sites

The two pilot sites selected are described as follows. Figure 1 shows views of both these taken from Google Maps.

Hile to Chhintang-Jyamire Bhanjyang in Sahidbhumi Municipality: The alignment of this road primarily follows the major ridges from 1,900 altitude downhill towards the temporary road head of Jyamire Bhanjyang (km24+000, at 1,150 m altitude). Although about 24 km of this road had been significantly upgraded in the years prior to the study, the conditions of several road sections were still found to be critical. The road was particularly damaged in places by deep rills and potholes due to

'road- widening' activities along the first few kilometres. Insufficient regular maintenance, especially in terms of drainage repairs, was evident.

Hile-Chhintang Ilaka Police Station to Shambu Gaon School in Pakhribas and Dhankuta Municipalities: The relatively horizontal alignment of this road follows the hill slope, creating many horizontal curves. In order to improve traffic safety by allowing the easy passage of trucks, additional by-passes were proposed.

Figure 1: Google Maps showing Pilot sites #1 (left) and #2 (right)

Despite the legal provision that 10 m on either side of rural roads (from the centre line) is RoW, it is not very common for such a width of land to be acquired. In the case of both the study sites, 5 m on either side remained in private hands at the time of study implementation.

3.2.3 Socio-economic Baseline Survey

The baseline data were collected in the latter part of 2017 (Site-1) and in July 2018 (Site-2) using a broad livelihoods analysis framework - considering in turn natural, physical, economic, human, social and political assets or capital.

Site 1, Shahidbhumi rural municipality: In total 17 households were identified to form a Road Users Group at site 1. They are ethnically homogenous, all belonging to the Rai hill ethnic group. They are also already active in a variety of community groups, indicating a positive social capital, with considerable experience in group organisation and decision-making. Nevertheless, they are of varied economic status – with a reported average annual household income of $ 4,600 (both sites combined) ranging from $ 235 to $ 15,960).

The natural assets of the households are rather limited; at a reported 1.29 metric tonnes of maize per ha, the agricultural productivity is well below the national average. The households' physical assets, however, are rather better than the national norms – with every household having a toilet and nearby water source, and all but one having a stone house with a corrugated roof. In terms of human assets, most household members are at least literate; this applies to 81% of men and 78% of women. However, they have no knowledge of improved composting techniques or marketing goods produced from amrisso and bamboo; this is considered as part of human assets as it is a skill that can be learned.

Site 2, Pakhribas and Dhankuta municipalities: A total 35 households were identified to become members of the RUG at site 2. They are of greater ethnic mix than at site 1. Although the majority are Janajatis (91.43% comprising Magars and Newars), there are minorities of Dalit (6%) and Brahmin (3%) households. While every household claimed membership to some community groups, it was

found that none were members of the School Management Committee or local cooperatives. Their membership was limited to local savings and credit groups (77%), such as farmers or mother's groups, and with Community Forest Users Group (CFUGs) as general members (22%); this indicated an average social capital with limited experience in group organisation and decision making.

The households also exhibited varied economic status, with a reported annual household income of $ 4,600. The natural assets of the households are also rather limited, and at a reported 1.47 metric tonnes of maize per hectare, the agricultural productivity is well below the national average. The households' physical assets, however, are rather better than national norms – with every household having a toilet and nearby water source, and as many as 86% households having houses with stone-mud walls and a corrugated roof, and the rest with houses in brick-cement masonry. In terms of human assets, most household members are at least literate; this applies to 94% of men and 82% of women. 38% of the children go to private schools. However, they have no knowledge of improved composting techniques or marketing of goods produced from amrisso and bamboo; this is considered as part of human assets as it is a skill that can be learned.

Politically, the area, including both Sites 1 and 2, is a stronghold of the Communist Party of Nepal (UML), and Shahidbhumi rural municipality enjoys strong links to Federal decision-makers. However, when the project commenced, the knowledge of all UG members regarding the RoW was limited. Key baseline indicators are summarised in Table 2 and more detailed findings are recorded in Annex 4.

Table 2: Summary of Baseline Values from Site 1 & Site 2

Asset	Indicators	Site-1 baseline value	Site-2 baseline value
Natural	Productivity of maize	1.29 metric t/ha	1.47 metric t/ha
Physical	Ownership of television set by household	59%	83%
Economic	Overall annual household income	5,854 USD	3,399 USD
Social	Membership of RUG (households)	17	35
Human	Number of children in private schools (total)	One child	16 (5 girls, 11 boys)
Political	Understanding of legal provisions regarding RoW	12% households	48% households

The intention in the project plan was to conduct an end-line study in Spring 2020 to assess the level of changes in household livelihoods compared with the baseline situation. This would be considered, primarily in terms of their economic assets, but also in terms of changes in their human, social and political capital. However, it was recognised that this information may be of limited value since the time period was short – possibly too short to demonstrate any significant changes. Also, had any changes been demonstrated, it would be very difficult to attribute these to any particular cause – not least to the effects of the RoW utilisation supported by the project. Rural Nepal is undergoing many changes as a result of many factors – many of which are completely outwith the control of the project.

In the event, the Covid-19 crisis rendered the end line study impossible – both because field visits could not be conducted, and because the government lockdown represents a strong confounding factor. Although still unclear at the time of writing, it seems likely that the Covid-19 crisis will have a

negative impact on household economies such that the impact of the pilot project interventions would be difficult to discern.

3.2.4 Formation of Road User Groups

Several meetings were held to orient the identified households about the study (see Box 1). Following this, they agreed to form two Road Users Groups (RUGs), each with a representative committee. For Site 1, the committee comprises seven members (two women); for Site 2, it comprises 11 members (two women). The RUGs and their committees have met regularly over the project period, supported by two experienced social mobilisers (field assistants) hired by the project.

Box 1: Process of RUG Formation

Process of RUG formation

- Invite all households to a mass meeting
- Share project purpose and the intended key stakeholders
- Discuss roles and responsibilities of the different stakeholders
- Explain the process of RUG formation and the roles and responsibilities of the RUG
- Participatory selection of inclusive Road Users Committee (RUC) members
- Ensure that all decisions are recorded in the minutes of the meeting
- Ensure that all present sign the minutes.

3.2.5 Establishing MoU between the RUG, Municipalities and Helvetas

In order to implement the project activities and to clarify the project's purpose at field level, an MoU was developed outlining the respective roles and responsibilities of the three concerned parties. The MoU was signed by the mayors of Dhankuta and Pakhribas municipalities and the chair of Sahidbhumi rural municipality, the Helvetas Project Coordinator and RUC chairpersons, with the concerned Ward Chairpersons acting as witnesses.

3.2.6 Site Preparation and Planting

Although only 5m either side of the road was legally acquired as RoW, the RUG members agreed to make all the RoW available for plantation with the understanding that this would also be supported by the concerned municipality.

shows the specifications for the carriageway, shoulder, road width and drainage ditches for district and village roads within the 20 m RoW. This shows that a width of 6.5 m was available for plantation establishment on either side of the road. In practice, this amounted to 1.16 ha at Site 1, and 1.7 ha at Site 2.

Table 3: Carriageway, Shoulder and Roadway Specifications

	Carriageway width (m)		Shoulder width (m)	Roadway width (m)
District Road (core network)	Hill	5.5 (If tariff > 400 vpd)	0.75	7.0
		3.75 (If tariff > 100 vpd)	0.75	5.25
		3 (If tariff > 100 vpd)	0.75	4.5
	Tarai	5.5 (If tariff > 400 vpd)	1.0	7.5
		3.75 (If tariff > 100 vpd)	1.5	6.75
		3 (If tariff > 100vpd)	1.5	6
		3 (If tariff > 100 vpd)	1.5	6.0
Village road	Hill	3	0.5	4.0
	Terai	3	0.75	4.5
Source: Nepal Road Standard-2055 (2nd edition-2071), DoLIDAR, Ministry of Federal Affairs and Local Development *Note: Above given width excludes drains, parapets and top of retaining wall*				

Since Site 1 is located along sloping land with no human settlements, there was relatively little cultivation along the roadside, but at Site 2 there are some settlements close to the road, with both sloping and terraced lands along the RoW. These had been cultivated in the past - generally with maize and tomato. Existing vegetation in the Site 2 RoW, the 2.1 km Marga-Dharmasala stretch, was assessed. Approximately 356 trees were found, with uttis (*Alnus nepalensis*) and chilaune (*Schima wallichii*) being the dominant species. There were also some patches of bamboo (*Dendrocalamus* spp.) on the sloping roadside areas.

It was the RUGs that conducted site preparation work for the plantations, as follows:

Site clearance: Site cleaning is a crucial activity before plantation establishment to unwanted weeds and scrub species that will compete for nutrition and light. This clearance was conducted shortly before the planting season began in July 2018. The effect of shade on amrisso growth was discussed with the RUG members and they realised there was a need to thin the uttis trees in the denser areas to increase the area for amrisso and to minimise the negative effects of shade on growth.

The slope surfaces were trimmed and levelled for plantation in such a way that water gets drained easily from the slope thereby preventing any water logging and thus chance of landslide. The surface water thus collected on the road could then channelled to an already existing cross drainage located at suitable distance. The vegetative cover of amrisso and other plants (including grown trees) and the controlled water conveyance protect the valley side from any chances of landslide.

Photo 1: Collection of saplings at site #1, 2019

Compost management: the application of organic matter (animal manure or compost) is important to obtain rapid establishment and growth of amrisso. However, RUG households have no practice of manuring amrisso as they generally consider it as a low input crop, used only for domestic purposes (mainly fodder). The application of 1-2 kg of compost per planting pit was recommended to enhance the growth of amrisso with a further application of farmyard manure at the time of the first weeding after plantation establishment.

Collection and preparation of plant saplings for plantation: Amrisso is readily propagated from its rhizomes, which can be taken from an existing plant. As there is already a considerable amount of amrisso in the area, adequate planting material is assured. Arrangements were made with several farmers, giving preference to those who were also members of the RUG, to provide the required quantity of planting material. In total, 21 local suppliers including RUG members were engaged in the sapling supply (see photo from Chhintang Garakola, Site 1).

Planting: The amrisso saplings were planted into the prepared pits at both pilot sites during June 2018. At this time of year, soil moisture is usually adequate as a result of pre-monsoon rains. A total of 6,090 amrisso saplings were planted at Site 1 and 8,060 saplings at Site 2. Although amrisso is fairly drought tolerant, due to the long dry period that took place immediately after plantation establishment, it was irrigated at 5-day intervals to avoid excessive mortality. Normally, the monsoon rain would be adequate without additional watering. During the first year of establishment, the amrisso plants were weeded at least three times to ensure optimal growth; during subsequent years annual weeding is generally adequate. Table 4 records how the number of plants required was calculated for each site. Note that this varied considerably between the sites depending on actual availability of planting sites e.g. some parts of the sites were not suitable for planting (rocky, too steep, occupied).

Table 4: Calculation of planting material for Sites 1 & 2

Site	Length of Road (m)	Width of plantation area in left (m)	Width of plantation area in right (m)	Spacing of plant (m)	Effective area of Plantation- (deducting existing coverage)	Number of plants both left and right
1	1,000	6.5	6.5	1.5	75.5%	6,090
2	2,100	6.5	6.5	1.5	59.3 %	8,060

Low-cost fencing: As the roadside area is open, and livestock graze freely along it, there is always a risk of browsing, particularly along the lower side of the road which is more accessible to livestock. Therefore, fencing was constructed by members of the RUGs using locally available materials, mainly bamboo poles (see photo from Chhintang Garakhola, Site 1). Only the stretches most vulnerable to livestock grazing were fenced (1,000 m at Site 1 and 350 m at Site 2). At Site 1, green fencing, using jatropha (*Jatropha curcas*) cuttings planted into the ground, was also used. Areas where there were existing retaining walls, rocks or that were otherwise not liable to grazing were not fenced. Fencing costs were not

Photo 2: Low Cost Fence erection at Site #1, 2018

estimated at Site 2 during site selection as it was not thought necessary. However, it was realised subsequently that fencing was required along some road sections where there was risk of cattle browsing. In both sites, the actual fencing costs proved to be considerably higher than originally estimated (Table 5). This was due a number of factors including the cost and availability of fencing materials and the higher lengths of fencing required compared with the original estimate. Depending on the materials used, fencing costs varied considerably. At both sites, low-cost fencing has proved effective in terms of protection from browsing cattle and costs are highly affordable by RUGs and Local Governments compared with alternatives (e.g. wire fencing).

Table 5: Estimated and Actual Fencing Costs

Site	Length of fencing required	Fencing cost (estimated)	Fencing Costs (actual)
1	1,000m	£ 190	£ 2,141
2	350m	0	£ 207

1GBP=143 NPR

Plantation establishment comprises clearing bushes, weeding, digging, fencing and planting. A total of 515 person days was used for plantation work at both sites. This comprised 260 person-days at Site 1 for and 255 persons days at Site 2. A summary of the site characteristics is shown in Table 6.

Table 6: Summary of Site and Plantation Characteristics

	Site 1	Site 2	Total
Location	Chhintang (Police station - Shambagaun)	Dharmasala Tower - Marga	
Municipalities	Shahidbhumi rural municipality	Dhankuta & Pakhribas urban municipalities	
Distance from Hile Bazaar	20 km	5 km	
Length	1 km	2.1 km	3.1 km
Area planted	1.16 ha	1.7 ha	2.86 ha
Approximate altitude	1,200 m	1,600 m	
No. of amrisso saplings planted	6,090	8,060	14,150
Mortality of amrisso	1,359 (22%)	582 (7%)	13.7%
Length of fencing used	350 m	1,000 m	1,350 m
Households in RUG	17	35	52
Person days used for plantation establishment	260	255	515

3.2.7 Plantation Maintenance

The project team regularly monitored the condition of the plantations, encouraging the RUG members about the benefits of the improved practices of planting and managing amrisso. Of the 14,150 amrisso saplings planted at the two sites, mortality was 22% at Site 1 and only 7% at Site 2. The main cause of mortality at Site 1 was a lack of rainfall in the first winter season combined with a long and unseasonal drought immediately after planting. The RUG members replanted the site in June/July 2019. The survival and growth rate of replanted areas was found to be very good; replanted areas record an > 95% survival at both sites.

Some plants were observed to be yellow in colour in Site 2 at Goganbote area which is close to Marga bazaar. This is due to a fungal infection, and treatment was recommended for those plants. The anti-fungal treatment was applied by the RUGs, and subsequently solved the problem.

During monitoring, the project team further enhanced the knowledge and skills of the RUG members in order to improve the identification of problems and diseases, and the relevant methods of treatment.

3.3 Capacity Development

3.3.1 Capacity Building for RUGs

Development of a training package: The project team developed a training package on growing amrisso which included the following topics: products and productivity of amrisso; its medicinal value; ways of adding value through further processing (e.g. broom making); markets and marketing; production technology; weeding; irrigation and composting. Financial literacy training material was also developed, and this included: financial management; income generation planning; simple accounting; savings and credit; productive use of loans; agriculture business planning (for individual and groups), institutional development activities such as formulation of by-laws, the process for registering an organisation, and opening and managing a bank account.

Training on Plantation maintenance: RUG members were regularly made aware of the importance of fire precaution and prevention measures - this being made an agenda point during their regular meetings. Some precautionary measures such as cleaning unnecessary weeds, and cleaning drainage ditches were undertaken by the RUG members. A second training on composting was also carried out, during which, RUG members prepared compost fertilizer at both sites; this was ready to use after two months.

Training on Market linkages: Two visits to regional market centres for RUG members were arranged in order to develop market linkages. In all 16 participants (of them, seven women) joined the first visit which included exposure visits to Ilam and Jhapa Districts (including to Bitamod and the cross-border market) to learn about the trading system of agri-products, especially amrisso. In a second visit, six participants from the RUGs visited Hile, Dharan, Itahari and Biratnagar markets and interacted with the traders. The outcomes of the market visits were that some participants started to collect agro-products from RUG members and sold them directly to collectors. By avoiding the middlemen, they were able to obtain better prices for their products.

The key traders, collectors and wholesalers were identified in a vertical market system of Dhankuta-Dharan-Itahari-Biratnagar and a horizontal market of Jhapa Bitamod and Janakpur by the RUG members. Through these links, the RUG members now have a direct mutual understanding with the traders in different locations. In 2019, they sold their agricultural products directly and fetched better prices, and one collector at each project site has been identified to collect the amrisso from the RUG members.

Training on Harvest and Sale of Products: Advanced technology training on the production of different cash crops such as tomato, beans, capsicum and ginger was conducted for RUG members. This also included coaching on the value chain-based market system, new farming technologies, and business planning. It was a short course designed by the project team, and was attended by 30 participants, including 14 women.

During the training, participants analysed the benefit-cost ratio of different cash crops for their own business and used this method to select the more profitable cash crops suited to the locality. Harvest technology, sale of products, linkage to traders and record keeping systems were covered. At the end of the training, participants prepared a simple business plan (covering production and selling) for selected commodities and also identified potential collectors for collective marketing.

A total of 2.86 hectares of land is planted to amrisso at the two sites. In early 2020, the age of the plants ranged from 8 to 20 months, due to the replanting, thus plants were a long way from full maturity and peak production. The first harvest of the amrisso was carried out in February 2020. The production of the amrisso was 150 kg at Site 1 and 50 kg in at Site 2. The total value of the amrisso, including the leaves for cattle feeding, was NPR 23,650 (approx. USD 193) much less than expected during the planning phase due to the long drought, lost plants due to the drought and sudden operations to widen the roads.

3.3.2 Road maintenance and upgrading

Assessment of the RoW prior to plantation establishment showed that some basic road maintenance was required at both sites. This included infilling of potholes and re-excavation of the drainage ditches – deemed necessary to ensure future road stabilisation. The costs of road maintenance would formerly have been borne by the District Development Committee (DDC) and DoLIDAR. Since this responsibility had been transferred to the municipalities, they had to make appropriate budgetary allocations in their 2018/2019 budget.

Photo 3: Roadside and drainage damage, July 2017

Photo 4: Workers clearing drains at site #1, 2019

Sahidbhumi Municipality identified an opportunity to take advantage of the Prime Minister's employment programme. This programme, which has been operating since July 2018, creates opportunities for unemployed individuals by providing 100 days of paid labour each year. The municipality (Ward 2) has paid about USD 2,000 for daily labourers to clean and build drainage channels atone of the pilot projects sites. The inset picture shows the building of a roadside drain at Garakhola Site 1, in Dhankuta.

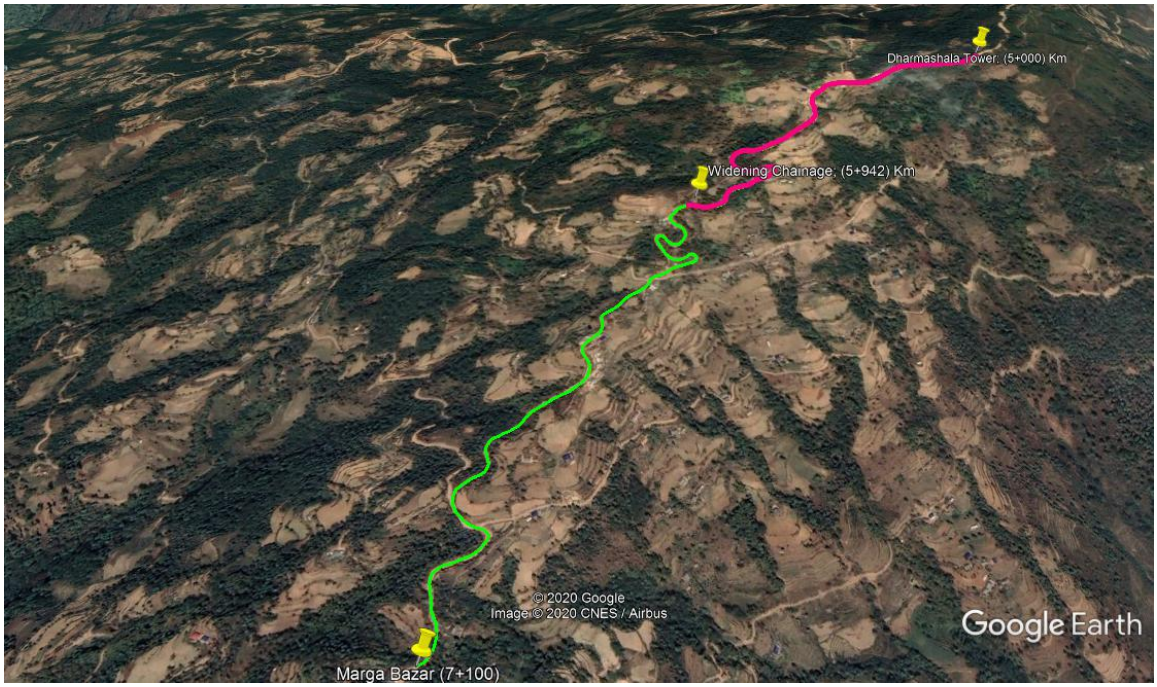
Somewhat unfortunately for pilot purposes – but typical of the trend in the country overall, the study sites were not exempt from road widening. Various discussions took place over the study period regarding the provincial and municipality plans for road maintenance and upgrading. Under provincial government plan, the Hile-Chhintang road was identified for upgrading 23 km plus an additional 17 km up to the border of Bhojpur district at Tribeni. They have kept this as a priority in their multi-year plan and have applied to the Asian Development Bank for funding.

As a result, only one year after planting, provincial funds were obtained by municipalities to widen roads by, on average, 0.75m on either side of the centre line - making 1.5m in total (see Figure 2) with

the adjacent plantation areas shown in green in Figure 3. This resulted in the plantation width being reduced accordingly by around 0.4 ha or 2,000 plants within the combined 3.1 km length of the two pilot stretches. Clearly municipalities need to balance the need for widening roads with the benefits of RoW planting for roadside stabilisation and RUG income generation. This highlights the need for good long term inter-municipal planning in coordination with the provincial government so that roads identified for RoW utilisation are not simultaneously targeted for road widening.

Recognising the need for coordinated planning, a joint monitoring visit was organised by the project team for key stakeholders and policy level representatives from both provincial and municipal governments to monitor the project activities and the road condition along the Hile-Chhintang Road. They included the Senior Divisional Engineer and Engineer from DoLI, the MoPID secretary and the Senior Divisional Engineer from the province, as well as ward chairpersons, mayors, others from concerned municipality, and RUG members. The Province 1 government stated that the Provincial and Federal governments had allocated NPR 27.5 million (approx. USD 224,400) for fiscal year 2018/2019 for structural works as well as for slope maintenance along the Hile-Chhintang road. They have also allocated NPR 30 million (approx. USD 244,800) for the same in fiscal year 2019/2020.

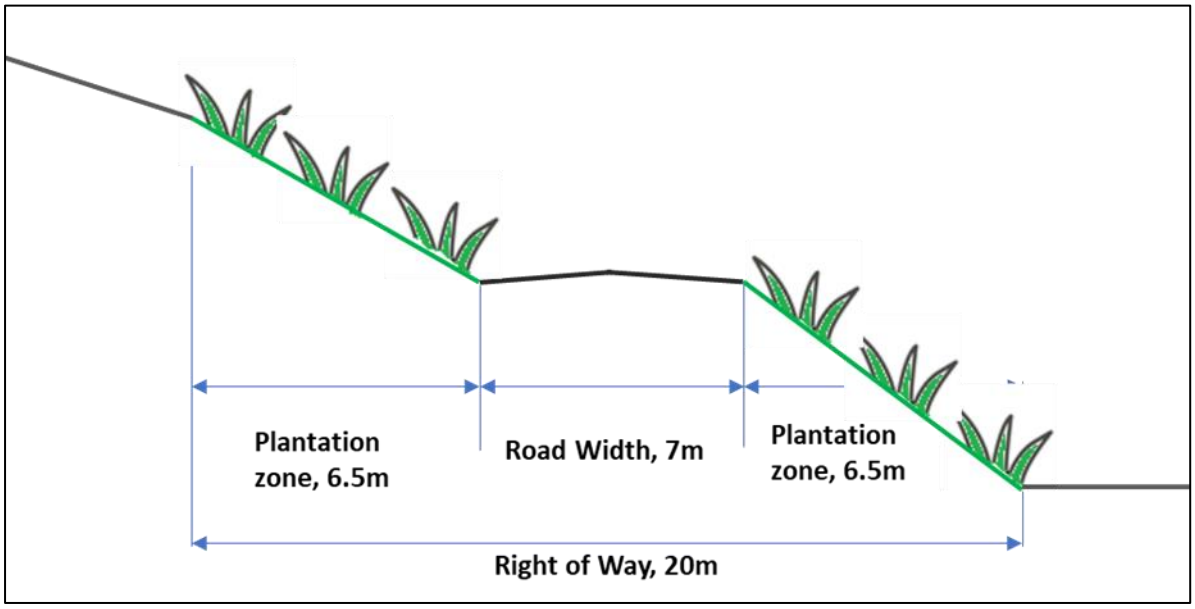
Figure 2: Pilot Site 2 showing road widening



Widened section of road

Pilot road section

Figure 3: Typical road section showing plantation areas (in green)



4 Economic Viability

4.1 Economic Benefits of RoW Utilisation

Although traditionally, amrisso has been sold for fodder in the Dhankuta area, the deliberate cultivation of the species for broom production had not been previously conducted by the RUG members. The added value of making brooms over the sale of fresh amrisso flower heads was found to be 27%. Through this home industry, self-employment of the beneficiaries is encouraged as is their motivation to make brooms for sale to different local markets. The gross income from the amrisso after year 1, in early 2020, was recorded as amounting to NPR 23,650.00 (Table 7). As expected, it is far less than the forecast because the plants had not reached full maturity; according to local conditions, amrisso production only maximises in the fourth year after planting. Other reasons for the amrisso productivity being less than originally expected include:

- Delayed project commencement; only 2 seasons have passed thus there has been insufficient time for the plants to properly develop
- Road widening works undertaken by the Local and Provincial governments was undertaken at unpredictable times and have reduced the planted area at Site-2, where a total of 689 plants were lost due to the bulldozing work. The perimeter of the planted areas reduced by 0.4 hectares. In addition, 1,941 plants were replanted in June/July 2019 as the plants did not survive in 2018, due to poor monsoon rains.

Table 7: Production of Amrisso in Year 1 (as of February 2020)

Products	Production and Value Year 1		
	Total Quantity (kg)	Market Value per kg (NPR)	Total value of production (NPR)
Broom flower Site #1	150	80	12,000
Amrisso for cattle feeding Site #1	2,625	2	5,250
Broom flower Site #2	50	80	4,000
Amrisso for cattle feeding Site #1	1,200	2	2,400
Total gross income (NPR)			23,650

Note: 1 GBP = 143 NPR

Yields are expected to increase in the future up to year four when maximum production will be experienced, and a total gross income of NPR 1.2 million can be expected, and a total sellable product (the amrisso flowers) will total NPR 987,600. Production on Site 1 was higher than on Site 2, in part because of plants being lost to road widening operations, but also because of the higher prevalence of open grazing and weed growth. About 2,900 plants were damaged from these effects. Broom flower production was clearly higher at Site 1 which had proper protection from cattle, thus justifying fencing efforts (see Table 8).

Table 8: The Investment Plan at Site 1 versus actual expenditure at both sites as of December 2020

	Projected			**Actual in both sites**
Site	**Dhankuta (Site #1 Only)**			**Dhankuta Sites #1 & #2**
Area	1.275 ha			1.16 + 1.17 = **2.86**
Plants	**Amrisso**			**Amrisso**
Costs	Scenario 1 (without fencing)	Scenario 2 (with Iron pole fencing)	Scenario 3 (with low cost fencing)	On the ground situation (low cost fencing) at both sites: -
Cost for fixed inputs (NPR) Including low cost fencing	no inputs required	1,369,010	545,244	335,175
Fertilizer	13,000	13,000	13,000	30,578
Land preparation and pit digging	20,000	20,000	20,000	162,547
Seedlings	12,752	12,752	12,752	209,932
Insecticides and Pesticides	0	0	0	0
Irrigation	0	0	0	33,561
Rental costs	0	0	0	0
Other labour cost	79,926	79,926	79,926	205,831
Support material	0	0	0	0
Transportation	0	0	0	0
Total Cost in Year 1	**125,678**	**1,494,688**	**670,922**	**977,624**
Average per ha. cost	98,571	1,172,304	526,213	**341,826**

All figures in NPR

4.2 Cost benefit analysis

A formal financial cost benefit analysis was conducted based on the actual costs from the project for 2018 and 2019. The unit of person-days for harvesting and inputs (labour) in 2020 was taken as the actual cost incurred by community. The estimated cost for harvesting and inputs (labour) was then calculated using the Salary & Wage Inflation index of the Government of Nepal (Economic Survey, 2019/20). It was assumed that the per kg rates of broom flower and grass are highly dependent on the consumer price index. Therefore, the average consumer Inflation Rate over the past ten years was used. This average rate was considered as the CPI and SWI rate for the remaining projection period. However, for reference the maximum and minimum rate were also calculated. The discount rate was 9.5%, based on the present interest rate for a fixed deposit.

Re-plantation with new plants is assumed to take place by 25% in 2025 and 20 % in 2026 (in the sixth and seventh years). It was also assumed that the quantity of plant maintenance, harvesting and any other costs will decrease by 5% as the yield of amrisso declines. The yield of broom flower and cattle

fodder was expected to decrease by 10, 15, 20, 25 & 30 percent respectively between 2025 and 2030. Based on these assumptions the project appears to be highly viable as break-even will be achieved in 2020 at the community level and in 2023 at the project level.

The cost benefit analysis shows that the by 2030 the cumulative discounted benefit-cost ratio is 2.81, the Net Present Value is more than NPR. 5 million (£ 33,543[2]) and the Internal Rate of Return is about 44 %.

4.3 Benefit-Sharing Mechanism

The RUGs understood from the start that since the RoW is owned by the Local Government, they must share the income generated from this land with the municipality. The development of an equitable benefit sharing mechanism between the beneficiaries and Local Governments is of key importance.

The benefit-sharing mechanism was discussed in depth during the pilot study with the RUGs, the beneficiaries, and the three concerned Local Governments. These meetings focused on the process, the activities and the expected results and projected returns, and participants themselves concluded that "20% of the gross income deriving from the selling of the amrisso flowers will be shared by the beneficiaries with the concerned local level government". The RUGs proposed the figure considering the potential benefits against their inputs which was happily accepted by the municipalities. It is extremely important that the sharing mechanism is both simple and clear, with no room for confusion, and that it is documented in the signed agreements between the RUGs and the partner Local Governments. The money should be deposited in the municipalities as internal revenue. They should not earmark this for fixed activities. However, RUGs can leverage this (20%) for negotiating with municipalities for road maintenance and other support which demand much bigger investments than their contribution

4.4 Viability Analysis

Based on the findings of the economic benefits and the cost-benefit analysis of the plantations, the overall viability of the piloted approach of the project in terms of its social, financial, legal, institutional, technical and environmental aspects is shown in Table 9. This has enabled conclusions on the overall viability of the piloted to be drawn and is the most significant factor which will affect further uptake of the approach to RoW utilisation in other locations across Nepal.

[2] Calculated @ NPR 150.67 = £ 1 (the official exchange rate of Government of Nepal on 21 July 2020)

Table 9: Analysis of the Viability of RoW Utilisation by Amrisso Plantation

Viability Aspect	Analysis	Issues	Replicability
Social	• 98% of the beneficiary population (52 households) engaged in the roadside plantation were from socially discriminated groups in the population. Only 25% of them had food sufficiency for the whole year from their own farms. • It was found to be possible to organise these households into RUGs for the plantation in the RoW. **Learning:** The project has been able to attract and mobilise the relatively poor and needy sections of the population, therefore RoW plantations appeal to poorer households who can potentially benefit from them more.	• During the project it has proved to be difficult to ensure a gender balance. Although local women have been involved throughout, the percentage of women participating in different project activities e.g. training, workshops etc. has remained less than that of men. **Learning:** More pro-active attempts need to be made to achieve a better gender balance – especially for capacity development for participating women. However, there is no evidence that a lack of women's involvement has impacted the overall benefits of the project approach.	Yes

Viability Aspect	Analysis	Issues	Replicability
Financial	• There was a clear financial benefit from RoW utilisation through income from selling amrisso. This can be increased when brooms are made and sold instead of the flowers (as raw materials for brooms). Adding value is beneficial. • A secondary benefit comes from making compost from the amrisso leaves. This not only reduces investment in fertiliser but also helps to maintain soil organic matter levels **Learning:** The importance of the training provided by the project for RUGs in both these aspects (broom-making and compost making) has been critical for the financial viability of the approach.	• Since the project began in July/August 2017, the plantations established in 2018 have only been productive for 2 years (since planting). This is too early to be able to accurately calculate the longer-term financial viability. • Damage to plantations because of road widening resulted in loss of some of the plantations – this would have also negatively affected the benefit cost ratio. • The projected Benefit Cost ratios for by years 2025 and 2030 are 2.06 and 2.81, respectively. The net present value in 2030 is calculated as more than NPR. 5 million and the Internal Rate of Return (IRR) is about 44 %. **Learning:** the discounted benefit cost ratio in 2020 (actual project figures) is less than 1 because the plants have not yet reached full yield. However, if the benefits are projected to 2025 and 2030 (next 5 and 10 years) the (cumulative) benefit cost ratios rise to 2.06 and 2.81 indicating that this is financially viable. The selection of road (existing) for RoW plantation shall be in such a way that there shall be no immediate widening – at least for one crop cycle - leading to wastage of efforts. In case of new roads, RoW plantation shall be treated as integral to road construction.	Yes

Viability Aspect	Analysis	Issues	Replicability
Legal	• An assumption of the project was that ownership of the RoW of rural roads was with the then District Development Committee. This changed as a result of the constitution and Local Governments now own the land and user rights. • In practice, only a few roads have a clear RoW on the ground. Even at the project sites, the legally established RoW is only 10 m wide and beyond this (a further 5 m on either side), is still under the ownership of private individuals who are still paying land tax on these areas. This unclear ownership situation affects the social and financial viability of the approach to RoW utilisation. **Learning**: Individuals are aware of the legal requirement for rural road RoWs i.e. 20m from the central line of the road. It was therefore not difficult to persuade adjacent owners to donate their land for RoW plantation (from which they would also benefit). It was also clear that the leadership of Local Government (and understanding of the legal situation) was critical for the legal viability of the RoW utilisation approach.	• Under the current Road Act and the corresponding Road Standards the RoW is 20m for rural roads. However, this may change in future as Federal, Provincial and Local Governments may also develop their own legal frameworks for roads. This will not take place until the Federal Government has passed into law a new Federal Road Act after which Provincial and Local Governments will develop their own legislation on roads. It will only be at this stage that new road categories, the RoW standards and utilisation and ownership issues will be clarified. This may take several years. **Learning:** In the absence of these legal frameworks, there is currently some confusion about which roads belong to which level of government. Utilisation of the RoW will be considerably easier when these legal frameworks and standards become law.	Yes

Viability Aspect	Analysis	Issues	Replicability
Institutional	• The project has successfully demonstrated the public-community participation model for RoW utilisation, under the leadership of Local Government, by establishing RUGs and by building their capacities. The Local Governments are supportive of the approach and have assisted in legally registering RUGs in their municipalities. • Legally registered RUGs are now able to prepare annual plans and budgets. As a result of capacity building, they are able to do this in a very transparent and accountable way. **Learning**: Equitable benefit-sharing mechanisms, agreed and signed between the Local Governments and RUGs are an important factor for ensuring that the RoW utilisation approach is effective from an institutional perspective. • The RoW Utilisation Manual has been developed for wider replication of this concept and process. All levels of Government now realize the importance of slope protection and utilisation of RoW land for its productive use, as well as the benefits that can ensue.	• Wider understanding of some of the institutional issues concerning RoW utilisation is still lacking e.g. the respective roles of the (older) Road Users Committee as implementors of works under the former Districts Authorities and the newly established RUGs collaborating closely with Local Governments. • Lack of institutional understanding is not confined to local people – but there is also an issue at the Local Government level itself (amongst administrative and technical staff as well as amongst elected representatives). **Learning:** Whilst guidance is already available on correct procedures for planning, financial management, procurement, monitoring etc. by Local Governments. this is deficient in that it mainly explains what needs to be done, rather than how it can be done whilst upholding accountable and democratic (deliberative) decision-making. More support is required to ensure this and the *Procedural Manual for Local Road Governance* was developed in response to this situation.	Yes

Viability Aspect	Analysis	Issues	Replicability
Technical	• Amrisso plantations are an established practice in the project area amongst private landowners. However, the project has clearly shown that it is also technically viable for RoW land where all actions are being implemented through RUGs (local groups) and where site conditions are favourable. • Use of local materials like bamboo for fencing seems viable, as does live fencing where suitable local species are available. • Local Governments are aware of the need to allocate budgets for rural road maintenance, and (as a result of the project) are prepared to allocate this to RUGs for specific sections of the RoW since this contributes to road maintenance through bioengineering. **Learning**: Use of amrisso appears to be technically feasible for the RoW sites – however, considering the wider landscape diversity in Nepal (and even adjacent to the project area) this would not be expected to be a technically viable option where climate, soils and elevation are significantly different.	• Initially, Local Governments had no resources to invest in maintaining the 22 km of road where the pilot sites are located. If the local governments preferentially selected the project site road for maintenance, this could have become a matter of public grievance. **Learning:** Careful site selection is required along with an appropriate package of interventions (site specific) to ensure that the RoW plantation is both technically feasible and beneficial for maintenance of the road. Since the 2 project sites are somewhat similar, this aspect has not been clearly tested by the project.	Yes
Environmental	• The environmental and bio-engineering benefit of the amrisso are well known and documented in many sources. Some of the steep sections of the RoW pilot site are now observed to have a much better vegetative cover. • The overall aesthetic appearance of the road section has improved. **Learning:** It appears that amrisso plantations in the RoW have only positive environmental effects.	• No issues were observed	Yes

In summary, the project approach and its viability or potential for wider uptake is evident from the pilot sites and from the response of stakeholders from other areas when project experiences were shared e.g. during the second knowledge sharing workshop:

- The approach is accepted by all levels of Government and specifically by the Local Governments with which the project has worked directly.
- It was later learnt that a few other Local Governments have initiated RoW utilisation although in these cases it has been seen as an approach to roadside conservation, rather than for local user benefits, seems to have been the major driving factor behind their use of the RoWs. Some examples are given in Box 2. These are regarded as spontaneous efforts from a few municipalities that the project team became aware of during the second knowledge sharing workshop. However, with a more pro-active approach to other municipalities involving more detailed explanation of the project pilot approach and benefits, further upscaling could be stimulated in future. See also section 6.2.4.

Box 2: Examples of uptake of the pilot model by other Municipalities

Putali Bazar Municipality Syangja The municipality has encouraged communities living along the road to plant broom grass and orange in the RoW (Syangja is declared as an Orange super zone). The Road User Group, a group for managing the road, coordinates between the municipality and the community living along the road. The municipality provides the seedlings. The communities living along the road (the ones who legally own the land and paying tax as RoW is not legally acquired by the government) plant them and accrue benefits. This is conducted individually (no specific groups for RoW plantation are formed).	**Musikot Municipality, Gulmi** Gulmi is known as coffee district is Nepal. Musikot municipality has encouraged the communities living along the road (9 km in length) to plant coffee on RoW land. Some part of the RoW land belongs to community forests. The municipality provided the coffee seedlings. People have planted coffee in some sections and will be accruing benefits as provisioned by the municipality. A point to note is the legal ownership of the RoW land remains with individuals.

The project team concludes overall that there is great scope that the project concepts and that it can be widely replicated. However, this will depend on addressing the issues identified (Table 9) and will require greater awareness at all government levels (Federal, Provincial and Local) to ensure that policies and legal provisions are supportive. This will be enhanced by the publication of the User Manual, training materials and the on-line e-training course.

5 Contributions to Policy Development

The project aimed specifically to contribute to policy development on rural roads and RoW utilisation. This has been done through several means including (i) Knowledge sharing workshops; (ii) Preparation of training materials and capacity development through conducing training and (iii) development of guidance manuals (procedural and technical). Some of these had been planned as project outputs from the start of the project, the need for others became apparent as a result of project piloting and during sharing workshop discussions and also as the roles of Local Governments have been clarified as a result of legislation developed to enact the provisions of Constitution of 2015. This has led to some significant and innovative project developments which contributed to rural roads policy development by Local, Provincial and Federal Governments beyond what had been originally planned and which will continue to do so after the end of the project. Highlighted achievements for policy development include:

- Wider awareness of the potential benefits of utilising the RoW for benefiting local people and the technical aspects of implementing amrisso plantations for doing this. This was a result of greater awareness and understanding from the 2 pilot sites and dissemination of the acquired knowledge through stakeholder workshops and was an initial project objective.
- A focus on capacity development – especially for elected Local Government representatives and staff of municipality administrations. This was achieved through training materials development with e-learning used to shift away from traditional classroom-based training as well as joint monitoring and site visits.
- Development of guidance on the wider aspects of rural roads governance covering deliberative processes for planning, (strategic, annual and site-based) through to implementation (procurement and working with RUGs) and to monitoring and maintenance in the Procedural Manual.

5.1 Knowledge Sharing Workshops

The project held 2 Knowledge-Sharing Workshops in order to share project experiences, lessons and information with a diverse group of stakeholders for issues relating to rural roads governance, management and utilisation of the RoW. The workshops provided an opportunity to raise and discuss key issues and for the project to respond to these in its future actions.

Workshop participants were from varied sectors. Participants in the first workshop were mostly local people (members of the RUGs at the two pilot sites); elected representatives from the partner Local Governments (including chairpersons/deputy chairpersons, ward chairs) and from Provincial Government; and few civil servants and technicians. The second workshop participants were decision makers - mostly elected representatives from representative Local Governments from all provinces, some RUG members, and senior engineers from Federal and Provincial governments. Unfortunately, representation of women was fairly low in both workshops (20% in each), although women were well represented amongst those participating from the local community (Table 10).

Table 10: Stakeholder representation at Knowledge Sharing Workshops

	Workshop 1		Workshop 2		All	
	No.	% women	No.	% women	No.	% women
Local people (RUG members)	19	37%	5		24	
Elected members (local and provincial government)	9	11%	36		45	
Civil servants/technicians	4	0	15		19	
Project team (including ReCAP)	8	0	11		19	
All	**40**	**20%**	**67**	**21%**	**107**	**20%**

An important outcome of both workshops was achievement of a common understanding about stakeholder roles and responsibilities for RoW protection and utilisation – especially in the changed context of Nepal's new constitution which assigns considerable responsibility and authority to Local Government for the construction, management and maintenance of rural roads. It was recognised that clarification was needed on the roles, responsibilities and relationships between different

institutions concerning RoW management and utilisation – including those of the local communities (represented by RUGs), Local Government, Provincial Government and Federal government. This was provided by the project through further capacity development and preparation of training materials as well as manuals on RoW Utilisation and on Local Roads Governance for Local Government (see parts 5.2 and 5.3).

Workshop 1: Issues & Actions

The first workshop was held in Hile, Dhankuta in October 2018. The following issues were discussed and actions taken.

Road Maintenance: Local people expressed a clear demand for better maintenance to improve the poor road condition at the pilot sites. The importance of this in order to provide access to markets and to services provided by Local Governments was raised. To address this, the following conclusions were reached:

- Local people (through RUGs) could be more effectively involved in maintenance if supported and encouraged to do so. This could go beyond their original role in the project of plantation establishment and maintenance in the RoW
- Local Governments needed to work together on road maintenance where a road passed through several jurisdictions (municipalities). A single blockage along the road would affect all users regardless of their physical and administrative location. In practice the 3 municipalities at the pilot sites do work together although somewhat informally e.g. all municipalities contributed resources for 'fixing' a problem spot even though this lay in only one municipality.
- Clarity was needed between the role of the Road Users Committee that had been established (some time ago) for the whole 20 km length of the Hile-Chhintang road and the more specific roles of the newly formed RUGs responsible for specific road stretches. In practice, the Road User Committee had been established in the past, mainly as a vehicle for disbursing funds for road maintenance (when this was the responsibility of the District prior to the new Federal Government Structure). Now that Local Governments are responsible for local roads, the role of the Road Users Committee seemed unclear since Local Governments themselves could undertake this role.

Roads Governance: Issues on roads governance were also raised and discussed during the workshop. These concerned:

- The difference in the governance arrangements between the long-established Road Users Committee and the RUGs. RUGs consist of all households and have an elected and accountable committee and transparent decision-making processes. Roads Users Committees do not have the same participatory and transparent structures.
- The lack of legal declaration of the RoW for the Hile-Chhintang road. As a result, landowners had not yet been compensated for their land taken up by the road when it was constructed and thus, the RoW land still nominally belonged to them even though it was no longer useable (and land taxes were still being paid on it). Regarding compensation it was considered less important because the dramatic increase in land values after road construction as well as the other benefits of the road, more than compensated for the area of land actually lost.
- The role of the Provincial Government required clarification. A new Provincial Roads Act was under preparation (which may lead to reclassification of the Hile-Chhintang road – which would then no longer come the control of Local Government). This issue had implications

for the project and also for the involvement of Local government and RUGs at the pilot sites. It would also mean widening of the RoW.

- The representative from the Provincial Government requested that the project should be better linked with the Provincial Government – as they were keen to learn and understand progress and because they also have a legal mandate for roads.

RoW Utilisation: This was also discussed, because at this stage, work had begun with amrisso planting at the pilot sites. The main issue concerned:

- Whether the plantations could be extended (with project support) beyond the RoW onto adjacent private land and if so, how the benefits would be shared. There were also some questions about the ownership of fruit trees within the RoW.

Actions: The following actions for implementation by the project over the subsequent period were agreed and implemented:

i) The project will assist RUGs to take on more responsibility for road maintenance - using funds channelled from the Local Government. This meant that such groups would be established for all stretches of rural roads. [In practice, RUGs have not yet been established elsewhere in the participating municipalities – but it is highly likely in future as the need for better RoW utilisation and road maintenance become apparent]

ii) The project will support RUGs to be properly constituted and registered with Local Government in order to properly handle funds, and open and operate bank accounts. [This support was subsequently provided by the project team]

iii) Procedures will be developed between Local Government and RUGs responsible for road maintenance - including allocation of funds, technical support, capacity development, monitoring etc. [These were developed into training materials and manuals e.g. Procedural Manual for Local Roads Governance]

iv) Capacity development of RUGs should not focus only on technical capacities e.g. on plantation maintenance or road maintenance but also on institutional capacity development e.g. on financial management, decision-making, equitable benefit sharing etc. [This was provided subsequently by the project team for the pilot sites through various trainings]

v) There is a need to develop and support formal processes and linkages that enable coordination between Local Governments where roads pass through several jurisdictions [This issue of inter-municipality coordination was discussed by the project team in follow-up meetings and has eventually been developed as a formal process in the Procedural Manual for Local Roads Governance]

vi) The possibility of investment in further roadside amrisso plantations was raised by some of the elected representatives. Project funds for this are limited, but it may be possible to consider allocation of funds from the Local Government's own road maintenance budget for this purpose. [Local Governments have allocated budget for this in their annual plans and budgets for next financial year – July 2020-21]

vii) Potential for a road maintenance fund will be investigated - e.g. fund sources, who should control the funds, and how this could be utilised [There has been no further progress with this]

viii) Transparency on the costs of maintenance works (cost norms) is required for various works that will be carried out by RUGs e.g. weeding, drain maintenance, minor repairs etc. [This information has been shared with RUGs].

ix) The project may need to respond if the road at the pilot sites is upgraded [The road was widened shortly afterwards and this led to a loss of some of the amrisso plantation. The project responded accordingly e.g. by carrying out some replanting etc.]

Workshop 2: Issues & Actions

The second Knowledge Sharing workshop was organized in Janakpur, the Provincial Capital for Province 2 in February 2020 and was attended by a wider group of participants – including from outside the project pilot sites. The purpose of this was to widen the understanding of project achievements. Discussions reflected the progress that the project had made since the earlier workshop and the interest of participants showed in this. Because it was held towards the end of the project, there was limited scope for the project to respond directly by initiating further actions, however some actions in response to issues raised were agreed by Local Government representatives and RUGs.

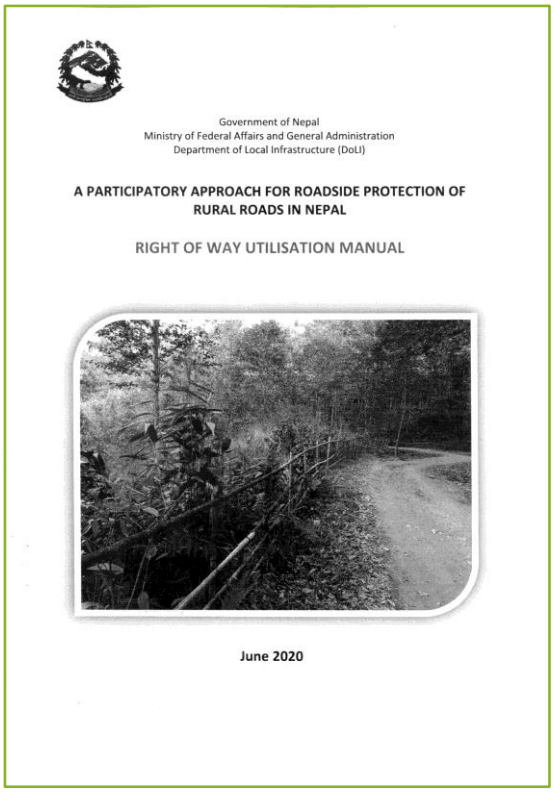
Discussions reflected the importance Local Governments place on rural roads for contributing to growth and infrastructure development more widely e.g. up to about 70% of Local Government development budgets is allocated for roads recognising this. Participants shared and discussed several related issues:

- Participating rural and urban Municipalities have formulated their own roads policies and made provision for RoW utilisation [Some are still being prepared. A deliberative policy-making process was incorporated into the Procedural Manual for Local Roads Governance]
- Municipalities outside the project area have already been developing roadside plantations along the RoW of rural roads using their own resources [The RoW Utilisation Manual and associated training conducted by the project will assist with expanding this approach across the country by providing technical guidance whilst the Procedural Manual for Local Roads Governance covers the deliberative procedural processes to be followed whilst doing this]
- The need for all infrastructure works to be integrated into a plan by Local Governments and to ensure transparency and accountability in the planning processes [This is very much the focus of the Procedural Manual for Local Roads Governance prepared by the project team]
- Due consideration to social aspects, especially pro-poor and inclusive dimensions of road governance and development was still required. Participants understood this (it is anyway a legal requirement) but how to actually ensure this was still unclear. [This is also a focus of the Procedural Manual for Local Roads Governance recently prepared by the project team]

5.2 Institutional Development

5.2.1 RoW Utilisation Manual

This was one of the major planned outputs from the project being an updated and completely revised version of earlier work on utilisation of the RoW initiated by the previous project. The manual describes step-by-step processes for productively utilising the RoW of rural roads in order to deliver benefits for local households and to sustainable manage and maintain the road through addressing some of the key environmental conditions. The RoW manual is directly based on field experiences and lessons from the two project sites and involves the key role of RUGs in implementing the RoW utilisation activities.

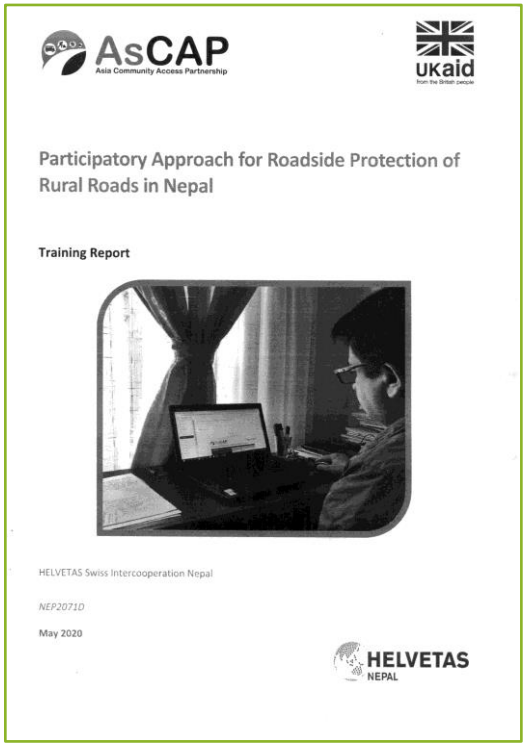


The RoW Utilisation manual is intended to serve a guidance for Local Governments, RUGs and other stakeholders such as NGOs and donor-supported projects to replicate the tested project procedures. It is written in a simple style appropriate to the capacity of likely users and has formed the basis of the training materials and training also produced by the project (section 5.2.2).

The RoW Utilisation Manual has been well-received and endorsed by the Government of Nepal and has been released for distribution by DoLI. It has been shared widely in Nepal.

5.2.2 Training Materials & Training

Experiences from the pilot sites showed that whilst overall responsibility for RoW utilisation, planning (including all aspects of participatory planning with RUGs and local communities) and technical support lies with the Roads Divisions/Sections of the Local Government Administrations, these persons would require some capacity development for them to be fully able to implement the approaches developed and piloted by the project. In particular, if the approach was to be mainstreamed across all municipalities in Nepal, it would not be possible for projects to work directly with all municipalities to provide this intense level of support. Consequently, a programme for capacity development of the teams in the Local Government Roads Divisions/Sections responsible for rural roads was required. This was developed in stages towards the end of the project in 2020 when it was possible to fully incorporate the key lessons and learnings from the project.



Capacity development consisted of two elements (i) development of training materials (training package) and

(ii) delivery of the training for the intended participants (technical staff of Local Government administrations).

Training materials were developed by the project team based on real experiences from the project. This included the following aspects:

- Procedural training e.g. using the RoW Utilisation Manual and the Procedural Manual for Local Roads Governance
- Legal aspects of local roads and RoW utilisation
- Formation and mobilisation of RUGs
- Technical training on RoW utilisation covering:
    - Aspects of bio-engineering
    - Site selection for tree, shrub and vegetation management
    - Surveying for RoW utilisation
    - Soil conservation, site preparation and planting
    - Plant maintenance, composting and harvesting
    - Monitoring
- Value addition and marketing
- Training of trainers (so participants can develop sufficient communications skills to be able to deliver training to local groups)
- Procurement and quality control training
- Training on deliberative processes e.g. for policy formulation

The training schedule included field exposure visits focusing on technical aspects of RoW utilisation. The target for the project was to train 75 technical officers from municipalities across Nepal by the end of the project in June 2020.

5.2.3 E-learning Training Course

Unfortunately, it was not possible to conduct face to face training workshops due to the COVID-19 pandemic which began in early 2020 during the last six months of the project. As an alternative, after consultation and agreement with ReCAP and DoLI, and the Project Team quickly developed an e-learning training course for online study using the same training materials that had already been prepared.

The e-learning training course was designed with a total of nine user-friendly modules, with questions to check participant understanding and a final certificate for print-out if participants completed the course. Both English and Nepali options are available.

The project team officially informed all 753 municipalities across the country about the existence of the course, requesting them to share the link with their technical staff (engineers and sub-engineers) and any other interested officials. All users must create a log-in account, but this can be done very quickly and simply. The link for the course is: elearning.helvetasnepal.org/login/.

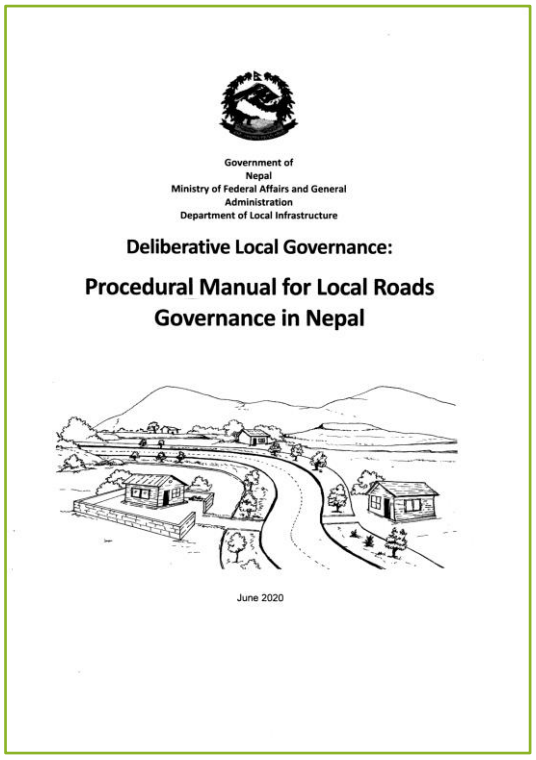
For purposes of reporting, the number of participants who enrolled on the course was counted up to May 2020 end, and reached 221 persons from across the country. By that time, 73 had completed it. Although only four women (5%) completed the course, this is a reflection of the very few women amongst the engineers in the municipalities.

Although the e-learning course was not a planned output of the project, it is now considered one of the major project achievements. It is a quality product that remains online as a sustainable resource to facilitate future learning after the end of the project. Not only does this represent a means to build capacity using the experiences of the project, but it also represents an effective means to work with participants across the large number of municipalities in Nepal which would otherwise be difficult and costly to reach by other means.

5.3 Procedural Manual for Local Roads Governance

The first knowledge sharing workshop conducted by the project team in 2018 raised a number of issues that had not been fully considered during project design. In particular, the role and capacities of elected representatives of Local Governments in local road planning, construction, monitoring and maintenance (including their role in utilisation of the RoW) was found to be particularly critical. Whilst the project had initially considered the technical aspects of RoW utilisation and the involvement and engagement of local people through the establishment of RUGs through a participatory process, the pivotal role of elected representatives of Local Governments in all aspects of decision-making concerning local roads was not initially considered as a key element of the project.

Elected representatives of Local Governments are expected to play a critical decision-making role – not for technical aspects of rural roads, which are within the remit of the technical staff of municipality roads divisions/sections, but for many other key aspects e.g. allocation of financial resources; planning for new roads versus existing road maintenance and for establishing and allocating resources to RUGs. Elected representatives of Local Governments also have to balance the allocation of scarce financial resources between the competing demands of all sectors for which they are responsible which include education, health, rural roads, agricultural services and economic development and they also have to make decisions on how to balance the allocation of resources to new projects, maintain existing assets e.g. rural roads and deliver of key services for citizens – especially in education and health sectors. Since the financial allocation for rural roads has consistently represented a major expenditure category for municipalities, the importance of following the correct procedures for local roads planning, budgeting, construction, procurement and maintenance was clear.



Existing guidance for Local Governments covering all these critical governance and decision-making aspects affecting rural roads is available – but it is covered in a wide range of different laws, regulations, procedural documents and guidance manuals some of which are not readily accessible to key decision-makers, some which are outdated i.e. refer to the situation prior to the new constitutional roles, and some which are difficult to understand i.e. not prepared in simple, non-technical language. Commonly these documents inform Local Governments what they have to do (many of the procedures are mandatory) but provide very limited guidance on how to do them – especially in a way that represents deliberative and informed decision-making which characterises democratic local governance. Consequently, it was decided to prepare a '*Procedural Manual for Local Roads Governance in Nepal*' to provide support and guidance, mainly for elected representatives, on

the practices of deliberative local governance. This procedural manual complements the technical manual on RoW Utilisation that was also prepared as a planned output of the project and the training that was conducted for the technical staff of municipal roads divisions/sections. It was discussed with DoLI during the process of drafting and has received important inputs from Federal Government – thus increasing its legitimacy as a formal guidance to procedures which Local Governments and their elected representatives should follow for local roads.

The Procedural Manual brings together a set of resources and guidance on deliberative decision-making processes into a single, accessible document. It is widely applicable – and can be used for all aspects of local roads governance by all municipalities in Nepal.

6 Findings and Lessons

The Participatory Approach for Roadside Protection of Rural Roads in Nepal (NEP2071D) was designed and implemented to test a participatory community-based approaches for an economically beneficial model of utilising Right of Way (RoW) land, at the same time as protecting the road. This chapter identifies the main findings or results of the project and analyses these against the intended project research objectives to derive the key lessons.

Specific project objectives were:

i. To pilot the institutional structures as recommended by the first stage
ii. To adjust the methodology and manual with the experience of actual implementation
iii. To devise a basis for revenue sharing among beneficiaries and local governments
iv. To link roadside plantation with road maintenance and slope protection

Project results are grouped and discussed according to these 4 specific project objectives.

6.1 Results Achieved Against Project Objectives

6.1.1 Institutional Structures for RoW Utilisation

The project concept envisaged piloting of RUGs as potential community-based institutions for RoW utilisation - specifically, for the establishment and management of amrisso plantations at the pilot sites. Experience from these 2 pilot sites clearly demonstrated that this is a successful and potentially replicable approach. In fact, the project has demonstrated that once established, RUGs as responsive and viable local institutions, can take on more responsibilities than were originally envisioned by the project beyond RoW utilisation e.g. RUGs can manage funds (from a range of sources); they can take on routine maintenance work for their local road sections under arrangements with Local Governments; they can participate and contribute in joint monitoring and they can be involved in the business aspects of value addition (e.g. broom making) and marketing of products. However, certain critical aspects of RUGs need to be in place for this to become feasible:

- RUGs must be formally registered as legal institutions with their respective municipalities. This enables them to open bank accounts and gives them a clear legal status and mandate. The Public Procurement regulations then permit Local Governments to implement certain types of activity through RUGs and legal registration enables RUGs to receive funds from different sources in future, including as cash donations from their members or to issue loans to members from their own sources.
- In order to ensure social inclusion, democratic local decision-making, transparency and accountability, RUGs must have democratically elected and representative executive committees and RUGs must have a clear legal mandate for the involvement in the roads sector. In practice, this is well known in Nepal since similar user groups have been involved in

various sectors (e.g. water, forest, roads, agriculture, schools and health) for some time. Future roads legislation and policy e.g. at Federal, Provincial and Local Levels must include provisions for, and clarity on, the role of RUGs.

- Capacity development is critical for the effective functioning of RUGs. This includes developing their technical, institutional, administrative and financial capabilities. This contributes to their effectiveness in the sustainable utilisation of the RoW and ensure this can continue after the end of the project.
- Building capacities and the legal status of RUGs is insufficient unless concerned Local Government representatives and Local Government administrations are aware of their capacities and their status. This means that these people also require a level of capacity development – project experience is that this is best conducted together with capacity development for RUGs.
- Establishment and subsequent support for RUGs to enable them to effectively utilise the RoW and carry out other functions requires a series of process steps. These are now documented in the RoW Utilisation manual produced by the project. These steps include:
    - Identifying road users
    - Holding preliminary meetings with local stakeholders.
    - Sharing and discussing the objectives of RoW utilisation to determine local peoples' interest
    - Identifying disadvantaged sub-groups as the target beneficiaries for RoW utilisation.
    - Formation of RUG (through a democratic process)
    - Capacity-building for the RUG committee and other group members on: leadership training; policy and governance awareness and coaching; social mobilisation; income generating activities, advanced farming, composting, manuring, pest management, and harvesting technology; value addition potential of their product; market linkage and system development; financial literacy and accounting; record keeping and account keeping; monitoring and reporting
    - Preparing RUG by-laws
    - Registering the RUG committee with the relevant municipality
    - Opening the RUG bank account.
    - Planning for annual activities
    - Implementing planned activities
    - Participatory/joint monitoring with other stakeholders especially Local Governments
    - Developing and supporting benefit-sharing processes

The project was also able to demonstrate that the effectiveness of institutional structures for RoW utilisation does not solely concern the RUG as the locally responsible institution, but also on two other critical factors:

RUG capacity and governance. This is especially important in relation to equitable benefit sharing and participatory decision-making. Previously when road construction and maintenance came under the former DDCs, Road User Committees were set up as local contracting organisations for certain road construction and maintenance works. These committees were not established having democratic and participatory decision-making processes with the result that they came to be considered as

contractors rather than democratic and locally representative institutions generating local benefits. They had very limited local 'ownership' amongst local communities and were normally accountable to the DDC rather than to local people. The project approach to RUGs being rather different, has shown what can be achieved through well-governed and accountable local institutions – developed through a process of capacity-building.

Linkages between RUGs and Local Governments. The prominent role now played by Local Government in management of rural roads under the Federal Constitution has made this relationship particularly important. To work effectively, the institutional linkages between RUGs and Local Governments were fostered and supported by the project. This has required capacity development on both sides – often undertaken together e.g. in the form or workshops, trainings and joint monitoring. Within Local Governments, the role of Ward Chairs and Ward Committees are particularly important since these frequently have common members with the RUGs. The lesson is that working with and supporting RUGs in isolation from Local Governments (including Wards) is ineffective.

6.1.2 Technical Methodology and Manual Development

Technically, the project did not experience any significant issues with the interventions used for RoW utilisation. From the pilot sites it was found that the planned intervention for RoW utilisation (amrisso plantation) was technically feasible (at least for the selected pilot sites) and resulted in local benefits in terms of benefit-sharing of products and also in terms of contributing to road maintenance through stabilising the RoW and potentially reducing maintenance costs.

A few minor issues with amrisso plantations due to poorer growth at the poorest sites (thin soils) and as a result of excessively dry seasonal conditions or gaps in monsoon rainfall shortly after planting were experienced. These were not unexpected and could be easily resolved through subsequent replanting by RUGs. However, the importance of careful site selection for RoW utilisation and the importance of selecting appropriate technical interventions is indicated. From the experiences of the project, it appears that local people would be a first source of suggestions for appropriate RoW utilisation interventions based on their local knowledge and experience. Piloting of these over a few years (as was done in the project) would be the next step before expanding the approach to more sites. Key findings regarding RoW utilisation include:

- The RoW must be defined, marked out on the ground, and the entitlement to use this land transferred to the local level before plantation establishment begins.
- When choosing the plant type for the RoW plantations, the selected species should be perennial, tolerant to adverse climatic condition, such as drought and frost and provide potential benefits for adjacent communities. A list of such plants is available in the Right of Way Utilisation Manual as well as in the Annex 8 of this report.

As a result of experiences at the 2 pilot sites, the project has enabled the 'Right of Way Utilisation Manual' to be completely revised and improved. The manual now incorporates all the necessary technical information required to establish and sustainably utilise amrisso plantations on the RoW and can be used by staff of municipalities across Nepal. The associated training materials have also supported this. However, as a result of the limited environmental and socio-economic diversity across the 2 pilot sites, other potentially appropriate utilisation interventions applicable for other eco-zones have not been tested and developed. Whilst the process for establishing and supporting RUGs may not differ significantly for different sites, the actual interventions may vary considerably and have not been researched, tested and analysed. The lesson is that in order to do this, a greater number of pilot sites across a greater range of conditions would be required.

6.1.3 Economic Benefits and Revenue-sharing Arrangements

The project aimed to determine the overall economic benefit for local communities resulting from RoW utilisation by amrisso plantations. The annual production of the amrisso was 150 kg at Site 1 and 50 kg in at Site 2. The total value of the amrisso, including the leaves for cattle feeding, was NPR 23,650 (approx. USD 193). This was much less than envisaged during the project planning phase for a range of reasons including the long drought in 2018 monsoon season) and plants lost due to operations that took place to widen the roads in 2019.

Unfortunately, the lack of a socio-economic follow-up to the baseline conducted in 2018 due to the COVID 19 outbreak has limited the extent of quantitative economic analysis. Furthermore, since the plantations were only established in 2018, data from 2020 representing only 3 years of growth, had it been able to be collected, would have had limited value in terms of establishing the longer-term economic benefits. For a pilot – even using a fast-growing species such as amrisso, a longer timescale would be needed to establish the economic benefits.

However, from the overall analysis of economic viability (Chapter 4 and Table 9) it appears that amrisso plantations could prove economically viable in the longer term with a financial IRR of about 44% given certain conditions including:

- That sites for planting are carefully selected. For example, at the pilot sites grass growth was 8 times higher on the lower side of the road than the upper. Presumably this was a result of factors such as drainage, soil availability and soil moisture retention. Poorer sites may need to be differently treated using other species or other planting techniques.
- Protection (from grazing) as found to be essential for establishing a viable and productive amrisso plantation. Browsing by free grazing livestock can seriously reduce the productivity of the crop if allowed to continue without restraint
- Costs of fencing to protect plantations have an important effect on overall viability. If fencing is carried out at least one month prior to the monsoon when costs of materials and labour are cheaper, this improves the overall viability of the plantations. Materials sourced distantly or purchased after planting during the monsoon add to the costs.

Concerning the revenue sharing arrangements, it is again somewhat early to derive any clear results or lessons. However, a clear finding from the project is that the economic viability of the amrisso plantations in the RoW is significantly enhanced through activities aimed at adding value to the harvested plants. Amrisso flower-heads can be sold directly, or made into brooms through a simple locally feasible process that results in a better return than direct sales. Similarly, amrisso leaves can be used directly as fodder (or sold) but can also be converted to compost which has local sale value again enhancing the return on the plantation investment. Both these processes for adding value depend on introducing sufficient local knowledge and capacity of RUG members (through training) and also on project-supported efforts to identify markets for the products. A general lesson is that adding value will enhance the economic benefits from RoW utilisation.

6.1.4 Linkages between roadside plantations, road maintenance and slope protection

Of the 4 specific project objectives, this one has delivered least in terms of a clear evidence-based result or any significant findings. Although RoW utilisation appears to have had clear social, economic and institutional benefits for RUG members, no information was generated by the project though monitoring and analysis of the road maintenance costs to demonstrate that roadside plantations of amrisso could reduce or otherwise affect the costs of maintaining the road section. This was because, such comparison opportunities did not exist. The maintenance of few road pockets lying beyond the pilot sections was carried out by municipalities based on the dire need often caused by the torrential

monsoon. The pilot sections of the road remained in better conditions compared to the ones those received maintenance. However, a part of the pilot section at site 2 received road widening.

Although RUGs have proven to be a viable means for carrying out routine road maintenance – with funds being channelled through them by municipalities, it is unclear whether this actually reduces the overall maintenance costs. However, by working with RUGs in this way, Local Governments can at least ensure that road maintenance budgets contribute to and remain in the local economy – rather than being channelled to distantly-located contractors. Hence, there appear to be economic benefits from RoW Utilisation by RUGs although the value of this has not been quantified or compared with other possible road maintenance methods. The effect of plants on slope protection and erosion control would anyway be expected to be generated over a longer period than the 3 years of the project. Locally, close to the pilot sites, there is abundant visual and anecdotal evidence that over a long time period bioengineering can do this – for example on the Dharan-Dhankuta Road which now enjoys considerable stability after huge bioengineering investments were made during the 1990's despite the fragile soils, high rainfall climate and seismic vulnerability. Nevertheless, these were not carried out by RUGs but through large-scale management contracts.

Theoretically, based on principles of bio-engineering, if the RoW is largely covered with growing vegetation, it would be expected that this would lead to reduced runoff from bare soils and greater rainfall infiltration and soil moisture retention. The binding effect of plant roots on soils and thus reduced soil erosion is well documented[3] and amrisso was specifically selected for the pilot sites because of this (in addition to its potential economic benefits). However, the project has not generated any evidence that this has led to reduced costs of road maintenance.

6.2 Other Results

Apart from the stated project objectives, the project has generated several other important findings and results.

6.2.1 E-learning and Training

A finding of the project which was somewhat unexpected has been the relative success of an e-learning approach as a means of reaching a group of widely dispersed participants from municipalities across Nepal. In the past, capacity development and training has been considered as a face-to-face activity between trainers/facilitators and participants. Because it was not possible to pursue this training approach for the final round of project training in early 2020 as a result of the COVID pandemic, a decision was made to deliver the training on-line using adapted training materials. This proved an unexpected success with participants signing up and completing the training from across Nepal. The widespread availability of internet connectivity has been an obvious factor in this – since only a few years ago, this would not have been possible.

The e-learning approach clearly has some advantages in Nepal as a means for reaching widely dispersed participants and can result in considerable cost-savings from reduced travel and would appear to be replicable. However, adaptation of conventional training materials for such an on-line approach also requires a significant investment in time. However, there is a clear lesson from this in that such approaches to reaching a wider audience may be highly applicable for Nepal.

6.2.2 Institutional Linkages and Collaborative Working

An important project finding was that participating municipalities and wards at the project sites showed a ready interest to be involved with the project and to work collaboratively and across-sectors with the project team to develop and support the piloting of RoW utilisation approaches. Clearly, they

[3] E.g. Howell, 1999; Gray & Leiser, 1982

were aware of the potential benefits – although probably more with the indirect benefits of ensuring better and more cost-effective rural road maintenance leading to improved accessibility to markets and services by rural populations throughout the year. This level of interest was illustrated by their willingness to invest their own resources and time in programme activities.

The links between the RUGs that are critical to RoW utilisation and Local Governments is close – much closer than if a similar programme had been implemented under the previous district-based system. Elected representatives of Local Governments are almost inevitably local persons who may have had previous experience as executive committee members or general members of user groups of different kinds. Building a useful collaborative institutional link between RUGs and Local Governments has therefore been relatively straight-forward. RUG members do not have to travel far to register their groups, open bank accounts or deal with government officials (elected or non-elected) and similarly, elected Local Government representatives are often familiar with the concerned individuals, households, institutions and the actual sites. There also exists a similarity in the levels of understanding which has made joint workshops, joint trainings and joint monitoring visits much easier. A lesson is that decisions on rural roads are best made as close to the actual sites as possible – as opposed to by other, more remote decision-makers located at more distant district, province or federal levels. This is not a new finding, but it was clearly brought out by the project's experiences and provides a good rationale for the RUG-based approach to RoW utilisation for rural roads. Whether this could be replicated for other road categories is unclear and untested.

6.2.3 Enterprises and Markets

The project has supported actions beyond establishment of amrisso within the RoW to also cover value addition and marketing. This has been a critical linkage – by itself, establishment of amrisso and sales of the flowering heads does not generate a significant return on investment. However, this is substantially increased if activities for adding value to the product are also incorporated. The project supported training and marketing of the brooms made from the flowering heads of amrisso – especially by enhancing the skills of women to make brooms since this is an activity that can be pursued in the home and without external inputs. In connection with this, the project also supported an individual to become involved with marketing of the brooms in local and regional markets. Project-supported field visits were also helpful for RUG members to assess and understand markets. A significant finding of the project is that developing capacities on adding value (and marketing) will enhance the benefit from RoW utilisation will bring greater returns for RUGs. Clearly the actual actions involved depend on the type of RoW utilisation activity that takes place.

The pilot study RUGs continue to build on exchanging information about their production plan of amrisso and other agricultural products with the concerned traders and wholesalers. For the better collectors, this might be extended to the sale of other agricultural products, and they should encourage the collection and sale of local products collectively.

6.2.4 Project Documentation and Ownership

A feature of the project has been the platforms used for discussing, sharing and planning between the project team and key local stakeholders including RUG members, Local Government representatives and others. The practice of participatory workshops, joint planning and joint monitoring (including site-based monitoring) has proved to be effective in contributing much to better understanding and ownership of the concepts and are considered as good practice in action research for the roads sector. However, such participatory approaches are not without costs in terms of time and budgets and care must be taken to ensure a genuinely inclusive level of participation of all, including the less articulate stakeholders who may easily be excluded – even if inadvertently.

The project team conducted two knowledge-sharing workshops related to roadside protection and RoW utilisation. Local government officials and elected leaders of the local government activities

participated in these workshops along with community representatives and were enthusiastic to replicate the good practices in their respective areas.

Since the project has had some significant learnings and has developed some good practices for RoW utilisation and for working with RUGs and Local Governments, documentation of these is critical to ensure that they can be replicated more widely. As a result, the project developed the *RoW Utilisation Manual* which captures the process and approach of this project based on real experiences and learning. This manual provides a clear guideline for policy development and implementation of roadside protection and utilisation of the RoW. It will be endorsed by the GoN through the DoLI, and shared with the local level technicians as an important reference document. Some municipalities e.g. Musikot Rural Municipality of Gulmi District, Diprung Rural Municipality of Khotang District, Madi Rural Municipality of Kaski District and Putalibazar Municipality of Syanja District, have informed the project partners that they have already initiated roadside plantation activities and protection works along the rural roads under their jurisdiction.

Similarly, the recently finalised *Procedural Manual for Local Roads Governance* will enable RoW utilisation to be practiced within the wider framework of Local Government procedures of planning, medium-term expenditure frameworks and annual budgeting, road design, construction and procurement, maintenance and monitoring. The manual was an additional output developed by the service provider independently of the scope of the project (NEP2071) however, the material for this manual derives partially from the direct experiences of the project. The manual also draws on the wide range of guidance and regulations which may not be readily available or understandable by key officials of Local Government. Contributions to this manual also came from Federal Government representatives (from DoLI). This is also seen as a means for sustaining and replicating the project's approaches to local road governance and it can be widely applied across Nepal. There has also been some interest in this manual from other development partners involved with supporting Nepal's roads sector e.g. by DFID.

6.3 Key Lessons

Project Design and Site Selection for Pilots

The project began at a time of considerable uncertainty shortly after Nepal's Federal Constitution came into effect, but before there was real clarity and understanding on the roles and responsibilities of different levels of Government for the roads sector. Local Government elections, the first after many years, were held almost immediately after the start of the project in 2017 with the result that many elected representatives were new to the concepts and approaches required for the rural roads and RoW within their jurisdictions with which they would need to be involved and make decisions. Inevitably this has created some issues (e.g. see Table 9) although over the course of the project many of these issues have been gradually resolved.

Initiation and implementation of the project at this time of uncertainty has had some benefits. It has enabled the project team to focus more on capacity development for different stakeholder through workshops, training materials and guidelines - not solely for local communities and RUGs, but also for government officials and elected representatives – especially from the Local Governments in which the pitot sites are located. It was found that participants were keen to learn and were willing to embrace the new concepts for RoW utilisation when explained in a logical and clear way, and when the results were clearly visible at the pilot sites.

At a time when the structure of Local Government is still evolving and when capacities of both newly elected officials and technical staff are still relatively weak, the project team has been able to make an effective contribution towards improving these by their close engagement in capacity building through training and workshops and through supporting the essential procedures in planning and budgeting for the wider roads sector of Local Governments. This proved to be necessary in order to

frame the rather more specific activities concerning RoW utilisation with which the project was initially concerned within the wider roads sector.

The project was implemented at 2 pilot sites only. This has resulted in piloting in a very narrow range of socio-economic and environmental conditions considering the huge diversity in Nepal. Not surprisingly, the technical aspects of RoW utilisation and the likely economic and social benefits cannot necessarily be extrapolated across the country without further piloting across a broader range of conditions. However, this has not reduced the value of the project's approach which includes institutional capacity and local governance development (for RUGs and Local Governments) and which is likely to be highly replicable, but only its potential technical replicability.

The sections of road chosen for the research activities were suitable for testing the concept of the research project. However, the issue of haphazardly timed road expansion activities and the construction or maintenance of roadside drainage needs to be taken into account at all future sites. Ideally, roadside drainage and simple toe wall construction needs to be undertaken before plantation planning and operations begin. In many locations, the road width is markedly reduced once the road drainage system is built. In such cases, the roadside slopes may need to be altered to ensure that sufficient carriageway width is available – for example, at some points of the roads, where plantations have already been established, there may be a need for slope re-development where the slope is irregular or too steep, or where there is fresh debris. The risk of slope failure is much more likely during the monsoon and other periods of heavy rain, such as pre-monsoon storms. At the two project sites, however, no major damage has occurred although some plants were lost from a mechanized road widening operation that had not been communicated with the RUG.

Lesson 1: Focusing largely on the technical and participatory aspects of local communities (as originally planned) would not have been successful had the wider governance and capacity issues of RUGs not also been addressed. By doing both, the project has piloted an approach that is more appropriate in the context of Nepal, especially at Local Government Level, is one that is now more widely replicable across the country and one that engages with a wider range of stakeholders including those from Federal, Provincial and Local Governments than had been originally planned making its wider uptake more likely to become institutionalised. An example of this is from the Janakpur Commitment (see Annex 6).

Lesson 2: To ensure that technical, socio-economic and environmental impacts of RoW utilisation could be properly demonstrated, pilots must be undertaken across a wider spectrum of environments than has been piloted to date. It is difficult to define lessons from the technical interventions that the project has promoted to date.

Capacity Building

The project has shown that RUGs can utilise and manage the RoW as well as routinely maintain rural roads to a good technical standard and conduct a range of other activities. However, to enable them to do this, a considerable amount of capacity development is required. This has had to cover not just the technical aspects e.g. amrisso plantation establishment and management, but also their capacity to manage their own institutions – such as financial management, planning, conducting meetings and general administration. Investment in RUGs is therefore a significant project cost and this will be more cost-effective if (as the project has shown) RUGs can carry out other functions beyond solely RoW utilisation.

Lesson 3: Capacity development of RUGs for their self-governance is equally, if not more important that technical capacities to manage the RoW, since this will enable the RUGs to sustain after the end of the project with a range of different activities benefitting local people and will give Local Governments the confidence to continue to work with them.

Lesson 4: Capacity development activities cannot be directed solely at local communities for RoW utilisation and management. Under the Federal Constitution other key stakeholder groups for which capacities must be supported include (a) the elected representatives of local governments who have key decision-making roles in planning, budgeting, service delivery and monitoring in all sectors (including rural roads) and (b) the technical staff of municipal roads divisions/sections who may not be familiar with concepts of RUG establishment and support, and who must eventually become sources of technical and governance assistance for RUGs as well as their regular technical responsibilities within Local Government administrations.

Technical Aspects

Whilst the technical aspects of RoW utilisation that have been piloted have not demonstrated any particular problems, the variation in performance (growth) of planted amrisso at 2 sites with relatively similar environmental conditions has demonstrated a clear need to be very specific about the RoW interventions being used. Even on opposite sides of the same road there has been a large different in performance and survival with amrisso.

Lesson 5: Site specific planning at a micro-site level is indicated to take into account differences in soils, drainage, environmental conditions and also levels of biotic pressure (grazing). Detailed site planning with a range of interventions rather than a one-size fits all approach is suggested.

Lesson 6: It has been unfortunate that the project was not able to gather information on the environmental effects of RoW utilisation – especially the effects on soil erosion, runoff and road maintenance costs. This may prove to be of greater benefit than the immediate socio-economic benefits of the RoW utilisation if available, this information may result in wider uptake.

Economic aspects

It has not been possible to fully assess the longer-term impacts of RoW utilisation from the pilot sites mainly because information on growth and harvesting from only 2 growing seasons has been available. However, project experiences have highlighted several lessons on economic viability.

Lesson 7: Longer term monitoring at pilot sites to generate better evidence of the economic aspects of RoW utilisation is needed to address the question of economic viability. This would generate more useful information for local decision-makers.

Lesson 8: Consider the economic benefits of reduced road maintenance requirements (see also lesson 6 above). Systematic monitoring of environmental changes resulting from RoW utilisation and the associated economic benefits of this vis. road maintenance is still lacking.

Lesson 9: The project has focused extensively on the need to consider the potentially higher economic returns to communities from adding value to 'raw' products. This can create employment and higher cash incomes – critical at the moment where income-earning opportunities in rural areas are few. Scaling up these value-addition activities will benefit from the economies of scale, as will joined-up marketing of products between several RUGs e.g. transporting finished brooms to India.

Planning Frameworks and Local Roads Governance

By and large, across many municipalities, basic practices such as coordination, consultation, coherent planning and design uniformity on road construction have not generally been followed. This has resulted in the fact that most rural roads become unusable during the rainy season and repair costs are high. This is particularly important since the scarce resources of Local Governments also have to be allocated to service delivery across a range of sectors. Good governance by elected Local Governments plays a key role in how the rural roads are maintained and how the RoW is utilised, how the benefits are shared, and how much budget is allocated to new road construction and existing road maintenance respectively. This is largely the responsibility of elected representatives who need good evidence (such as from this project) for more deliberative decision-making. Without this, decisions

may be taken in the roads sector that result in environmental problems and increased maintenance costs.

Lesson 10: RoW utilisation forms only a small part of the wider picture of rural roads governance. A more effective approach is to support planning and decision-making of the whole sector to ensure that sufficient resources are made available for maintenance of the existing road network.

Lesson 11: Inter-municipality coordination is needed to address rural road maintenance and RoW utilisation issues since there are many rural roads that cross municipal administrative boundaries and jurisdictions. This implies a planning process beyond the municipality must be considered such as inter-municipality transport planning, to bring a more coherent approach.

Lesson 12: RoW utilisation should form an integral part of roads sector planning from the design stage in a municipality – not an added-on afterthought. This would avoid some issues relating to budget availability for RoW utilisation from Local Governments and would avoid the effects of rural road reclassification resulting in loss of planted areas in the RoW as the project has experienced. This will ensure maximum community benefit and optimal roadside protection.

Quality Control, Monitoring and Evaluation

From the start, the project adopted a participatory approach to working with different stakeholders including local communities, Local Governments and representatives of Provincial and Federal Governments. A range of project activities were thus conducted jointly with the results being 'owned' by different stakeholders. Project results from such monitoring have been widely disseminated and several municipalities have already started to replicate the project approach to RoW utilisation through RUGs.

Lesson 13: Joint monitoring – especially of pilot field sites has enabled the project's experiences and lessons to be more widely shared than if the monitoring had been conducted by the project team and shared only by written reports. This has allowed the project team to develop better working relationships with different stakeholder groups and has contributed to wider ownership of the project's outputs (manuals, training materials etc) and greater potential for the approach to be replicated.

7 Conclusions & Recommendations

2.85 ha of RoW along two stretches of a rural road in eastern Nepal was planted with amrisso through two RUGs, benefitting 52 households. A total of 14,150 amrisso plants were planted in 2018. However, due to unplanned widening of the road in one of the stretches and also due to mortality of some plants, an additional 1,941 seedlings were replanted. A range of capacity building activities have been organised for RUGs e.g. leadership, broom making, compost making etc. RUGs were also facilitated for their legal registration in the Local Governments. The first (partial) yield of amrisso has been harvested in 2020. The project has demonstrated a successful model of participatory approach in utilisation of RoW. Besides, projected benefit-cost ratio and IRR for 2030 are 2.81 and 44% respectively, indicating that the project is a viable approach for replication. Several key conclusions can be derived from the major lessons and findings of the project. These have been grouped into 4 categories:

- Overall Project Design, Implementation and Replicability
- RoW Utilisation Approach and Viability
- Socio-economic and Environmental Benefits of RoW Utilisation
- Governance and Institutional Aspects of RoW Utilisation

7.1 Overall Project Design and Implementation and Replicability

The two project pilot sites were selected along a single stretch of road in Dhankuta District. In addition, although the sections of road chosen for the research activities were initially suitable for testing the concept of the research project, haphazardly timed road expansion activities and the construction or maintenance of roadside drainage has affected both sites to a greater or lesser degree. Although this was to a large extent not predictable, it has meant that the potential economic benefits of RoW utilisation cannot be readily assessed (see next point) since the road widening has affected the costs and benefits of plantation establishment.

A conclusion can be drawn from this is that project design, in terms of site selection, was somewhat weak. To some extent this was beyond the control of the project e.g. the initially selected site in the Terai district of Kailali could not be continued and the road widening was not planned initially. But unfortunately, this has meant that the sites do not represent the diverse range of socio-economic or environmental conditions found across Nepal and so clear technical or socio-economic conclusions cannot be readily extrapolated from these sites to other areas across the country as would be necessary for wider uptake of the approach.

Despite this, of the four project objectives (Table 1) three can be said to have been completely achieved – not in terms of the success of the technical interventions for RoW utilisation, but in terms of the approach – which is largely replicable and which has worked to the extent that there is now some interest in replicating it elsewhere in Nepal. One objective, that of linking roadside plantation with road maintenance and slope protection, whilst achieved in terms of both being delivered via the same local institution (RUG) has not been fully achieved since there is no evidence that roadside maintenance and slope protection are directly affected by the RoW plantations at the pilot sites (although this could be inferred from widely held knowledge on the effects of vegetation on soils erosion and slopes). Unfortunately, there is no firm data from the project to confirm this. It would have been useful to gather data on road maintenance costs (perhaps by including a 'control' site) to address this.

Despite the lack of empirical economic evidence for the impacts of RoW utilisation on the costs of rural road maintenance, the project approach undertaken through a series of participatory workshops, through collaboration with different stakeholders and its relatively high profile in Nepal (partially due to the outputs consisting of manuals, training materials and e-learning) is highly likely to lead to wider replication of the approach - if not the specific technical intervention of amrisso planting. The close linkages between RUGs and Local Governments, especially with wards and ward committees, means that this is seen as a straightforward means of delivering benefits for local communities at the same time as contributing to project implementation and service delivery by Local Governments. It has been encouraging to see that already some municipalities are following a similar approach, and these examples will undoubtably increase as a result of the recent training. The Federal Constitution that has brought responsibility for rural roads to Local Governments has also contributed to this – especially since many elected officials have previously been members or office bearers of user groups of different kinds (especially forest user groups) and their experiences will have convinced them that RUGs offer an effective means for local involvement in such activities.

From a practical perspective, the implications of a new Provincial Road Act will need to be carefully assessed once this has finalised and passed into law. If the Hile-Chhintang Road in which the project sites lie lies is re-classified and is no longer a Rural Road (as it is under the old Roads Act), then there are implications for road maintenance responsibilities which will then fall under the Province rather than the Local Government. Another result of this might be that the road might need to be widened, and thus the dimensions of the existing RoW might change, which would affect the already established amrisso plantations.

7.2 RoW Utilisation Approach and Viability

The longer-term economic viability of the RoW utilisation approach via RUGs has not been fully tested, therefore clear conclusions cannot yet be reached about its longer-term economic viability. More years will be needed to assess whether the economic benefits accruing to local communities (especially to poorer households) from RoW utilisation plus the presumed additional economic benefits resulting from reduced road maintenance (for which information is not available) will be positive. However, early results do tend to indicate (Chapter 4) that these are already beginning to show. The project has supported RUGs to move beyond the simple establishment of amrisso plantations to adding value to the products (broom making and composting). This has been popular with local people and, with the addition of capacity support for such added-value processing plus training and field visits on marketing have increased the potential viability of this approach. Again, further information over the next period of years is still needed to draw firm conclusions.

7.3 Socio-economic and Environmental Benefits of RoW Utilisation

Since there was no follow-up to the socio-economic baseline in 2020 as a result of the COVID 19 outbreak it is difficult to draw any conclusions regarding the socio-economic or environmental benefits of RoW utilisation. However, assessing any socio-economic change against the baselines conducted only 2 years previously would have been extremely difficult, even had sufficient data been available. Any changes detected could have been attributable to a range of factors – not necessarily connected with RoW utilization or even rural roads. Probably a better approach would have been to conduct the baseline as a questionnaire or perception survey specific to the road sector asking questions about effects of the road on livelihoods and access to services rather than accumulating quantitative data. This would have enabled any changes in perception to linked with roads to have been picked up.

Similarly, the environmental benefits of RoW utilization cannot be quantitatively assessed without empirical evidence, although intuitively it would seem that if the RoW were better vegetated, then there would be a reduction in soil erosion, gullying along the roadside and damage to the roadway resulting from excessive runoff etc.

7.4 Governance and Institutional Aspects of RoW Utilisation

It appears that it is in the institutional and governance aspects of RoW utilisation that the greatest project influences can be determined. From a starting point which was a legacy of the pre-Constitution situation where road maintenance was the remit of the somewhat distant District Development Committee who were not seen as being directly accountable to local people, the shift towards Local Government as the responsible agency has stimulated an interest and activity in rural road maintenance. This shift has been reinforced by the project's approach which has been to focus on capacity development and facilitation of the linkages between RUGs and Local Government elected representatives and technical staff.

Coordination and consultation efforts with the Local Governments by the project has made them well aware of the project and its significance and of their particular role in RoW utilisation within this wider remit of rural roads. This is important because their internalisation of the piloted approach to RoW utilisation by RUGs and their own their role makes it highly likely that they will in future adopt this approach for rural roads in their jurisdiction. The enthusiasm with which the e-learning training has been received, and the interest shown in the projects 2 manuals (RoW Utilisation & Local Roads Governance) bodes well for this level of scaling-up.

Many of the legal issues such as type and classification of roads, the use of the RoW, and the roles and responsibilities of the three new tiers of government in relation to the local roads, have yet to be institutionalised, and this may take some considerable time. This may delay any immediate

dissemination and wider scaling up of the approach and useful learnings from this pilot project, although once the legalities, roles and responsibilities of each level of local government have been fixed, the experiences and learnings from this study will be extremely useful to all Local Governments.

To conclude, the project has provided a good example of best practice in participatory research for utilisation of the RoW of rural roads by local communities in Nepal. Despite a lack of empirical evidence to demonstrate clear impact, its approaches, achievements, and learnings should be shared in various fora, including workshops, relevant meetings, and in the future training of road engineers and technicians – especially those engaged by Local Governments. The documented project outputs (training materials and manuals) provide a highly relevant source of information to promote these approaches whilst continued monitoring of the 2 pilot sites would provide more information of the specific impacts.

7.5 Recommendations

Recommendation 1: For scaling up the project's approach and lessons, the first step would be to identify further suitable sites along rural roads for RoW utilisation by RUGs (across all municipalities), based on some clear criteria such as land availability, site quality, interest of local communities etc. Then, plans for RUG formation, capacity development for RoW utilisation and implementation should be incorporated into the Annual Plans and Budgets for the respective Local Governments. These planning processes are detailed in the Procedural Manual for Local Roads Governance. This will result in RoW land gradually coming under productive management of RUGs with consequent economic, environmental and social benefits.

Recommendation 2: There are strong possibilities to obtain extension services from the Local Governments to support RoW utilisation activities. In general, Local Governments have budgets available to them – and utilisation of some of their funds for this purpose would be possible by incorporating these activities in their Annual Plans and Budgets (as above). Benefit-sharing arrangements between RUGs and Local Governments (which form an important part of the participatory approach to RoW utilisation) would contribute in Local Government's internal revenues (which they are legally entitled to keep for their own development purposes) and would empower the RUGs to demand further related services for RoW utilisation and road maintenance from their Local Governments in turn. Further training e.g. for assistance in improving the marketing mechanisms can be delivered by service providers (such as local NGOs) procured by Local Governments for this purpose. Again, the procurement processes are detailed in the Procedural Manual for Local Roads. In addition, established RUGs may receive support from the Provincial Government (Division Forest Offices) for supply of seeds and saplings for their RoW plantations.

Recommendation 3: The Prime Minister's Self-employment Fund provides a potential opportunity to fund roadside protection and bio-engineering works, and thus for the wider adoption of the RoW utilisation through plantations. As more and more migrants return from India and overseas during the months following the Covid-19 outbreak, there is an opportunity for Local Governments to access these funds for expansion of the programme.

Recommendation 4: The Local Government needs to take responsibility to disseminate success stories of the RoW plantations. In view of encouraging adoption of the RoW utilisation principles and practices and expanding the programme to other communities, the willingness of the local households to participate in the programme is very important. From the pilot study experiences, it appears that it is those living close to the roads who are most ready to participate – although, it is not everywhere possible to find the poorest of the poor in these road neighbour groups.

Recommendation 5: If further funds can be accessed, it would be most interesting and highly beneficial for the RoW utilisation programme to follow the progress of the two pilot study areas and the RUGs over the coming decade. The respective Local Governments may be prepared to continue

to provide funds for monitoring at these sites (or Provincial Government) but funds for implementation of these plantation works should not continue – in order to ensure that the RUGs become sustainable from their own resources.

Recommendation 6: Clearly the pilot sites for the project are not representative of the huge environmental diversity in Nepal so that the technical interventions and impacts at these sites would not be expected to be widely replicable except where environmental conditions are similar. However, there is sufficient experience and material available from research and guidance documents to provide alternatives to the specific technical interventions that were piloted by the project for different eco-zones in different parts of Nepal. Chapter 8 of this report provides some useful background material for this. Pilot the approach in more diverse socio-economic and geo-physical environments

Recommendation 7: As Local and Provincial Governments move towards developing their own legal and policy frameworks for rural roads, it is important to ensure that RoW utilisation is included in this policy and legislation as it is prepared. This will contribute to institutionalising the project approach.

Recommendation 8: The various manuals and training materials provide a highly relevant and appropriate output of the project that can contribute to up-scaling of the approach to RoW utilisation across the county. Their value and utility will be drastically improved if they are translated into Nepal and widely disseminated to Local Governments (through web-based platforms e.g. DoLI website).

Recommendation 9: Based on the enthusiastic uptake of the e-learning approach, DoLI should explore ways by which this training approach can continue after the end of the project by its incorporation into existing curricula for engineers or technicians of possibly by continuing to manage and run the e-learning course themselves.

8 Reference Documents

Adhikari T.L., 2014, Geotechnical Practices in Nepal, Paper No. SL-04, International Symposium Geohazards: Science, Engineering and Management, Nepal

Deoja B., Dhital M., Thapa B., Wagner A., 1991, Mountain Risk Engineering Handbook Part 1, ICIMOD, Kathmandu, Nepal

Devkota S., Sudmeier-Rieux K., Penna I., Eberle S., Jaboyedoff M., Adhikari A. and Khanal R. 2014, Community-based bio-engineering for eco-safe roadsides in Nepal, University of Lausanne, IUCN, Nepal and DSCWM, GoN, Nepal

DoLIDAR, MoLD, GoN, 1998, Work Norms for Agricultural and Rural Roads, Volume V, Norms for Rural Roads, Work Items for Bio-engineering Works of Rural Roads, Nepal

DoLIDAR, MoLD, GoN, 2008, Rural Road Maintenance Directives, Nepal

DoLIDAR, MoLD, GoN, 2011, Quantity Estimate for Additional Financing for Slope Stabilization work, Rural Infrastructure and Livelihood Project (DRIP-AF), Pakarbas Galpa Road, Ramechhap, Nepal

DoLIDAR, MoLD, GoN, 2012, Rural Road Standards, Nepal

DoLIDAR, MoFALD, GoN, 2013, District Transport Master Plan Dhankuta District, Final Report, Vol. I: Main Report, Dhankuta, Nepal

DoLIDAR, MoFALD, GoN, 2013, District Transport Master Plan Dhankuta District, Final Report, Vol. III: GIS Maps, Dhankuta, Nepal

DoR, MoPPW, GoN, 1988, Nepal Road Standards, Nepal

DoR, MoPPW, GoN, 1995, DoR Strategy, Nepal

DoR, MoPPW, GoN, 2007, Road Maintenance and Development Project, Institutional Strengthening Component, Nepal

DoR, MoPPW, GoN, 2003, Reference Manual for Environmental and Social Aspects of Integrated Road Development, Nepal

DoR, MoPPW, GoN, 2003, Guide to Road Slope Protection Works, Technical Assistance of Japan International Cooperation Agency, Nepal

DoR, MoPPW, GoN, 2009, Roadside Geotechnical Problems, A Practical Guide to Their Solutions, Nepal

Fearnside A. 1977, Afforestation word list English-Nepali, Nepal Australia Forestry Project, Technical Note 1/77, Nepal

Gilmour D.A. and Fisher R.J., 1992, Villagers, Forests and Foresters, 2nd edition, Sahajogi Press, Kathmandu, Nepal

Gobinath R., Ganapathy G.P., 2014, Suitability Studies on Employing Soil Bioengineering Practice in Landslide Affected Mountainous Region in South India – A Case Study of Nilgiris district, Tamilnadu, India, Paper No. LF-26, International Symposium Geohazards: Science, Engineering and Management, Nepal

GoN, 1971, Local Administration Act, Nepal GoN, 1977, Land Acquisition Act, Nepal GoN, 1978, Land Revenue Act, Nepal

GoN, 1995, Forest Regulation, Nepal

GoN, 1997, Environment Protection Rules, Nepal

GoN, 1998, Town Development Act, Nepal GoN, 1999, Local Self Governance Act, Nepal GoN, 2012, Land Use Policy, Nepal

GoN, 2015, Constitution of Nepal, Nepal

GoN, 2017. Local Government Operations Act 2074. Government of Nepal.

Gray D.H. and Leiser A.T. 1982. Biotechnical Slope Protection and Erosion Control. Van Nostrand Reinhold Company Inc. New York.

Helvetas Swiss Intercooperation Nepal, 2013, Local Infrastructure for Livelihood Improvement (LILI), Nepal

Helvetas Swiss Intercooperation Nepal, 2013 Economic Analysis of Risk Reduction Technologies in Nepal, draft report, MetaMeta, Rain Foundation and HELVETAS (in Nepali), Nepal

Helvetas Swiss Intercooperation Nepal, 2015, Economic Analysis (Cost-Benefit) of the Risk Reduction Technologies in Nepal, draft, Nepal

Howell J., DoR, MoPPW, GoN, 1999, Roadside Bio-engineering - Reference Manuel, Nepal

Howell J., DoR, MoPPW, GoN, 1999, Roadside Bio-engineering, Site Handbook, Nepal

ICIMOD, Helvetas, Nepal, WOCAT, 2013, Riverbed Farming, Natural Resource Management Approaches and Technologies in Nepal

ICIMOD, Helvetas, Nepal, WOCAT, 2013, Land Distribution and Allocation for Riverbed Farming, Natural Resource Management Approaches and Technologies in Nepal

ILACO, International Land Development Consultants, 1981, AGRICULTURAL COMPEMDIUM – For Rural Development in the Tropics and Subtropics, Elsevier

Islam, S. S., Azad, Md. A.K., Kabir, J., Hossain, M.A.T, 2012, Financial Analysis of Keora (sonnetatiaapetala) Plantations in Bangladesh, Open Journal of Statistics 2, Bangladesh

ITECO Engineering Ltd., 1994, Handbook for Gully and Landslide Stabilization Methods in Bhutan, Bhutan

Johnson A.M., P.E., 2008, Best Practices Handbook for Roadside Vegetation Management, Final Report, Professional Engineering Services, Ltd., Minnesota, USA

Khanna, S. K. Rural Road Construction

Kuonen V. 1983, Wald- und Güterstrassen – Planung – Projektierung – Bau; Zürich und Pfaffhausen

Mamat M. F., Yacob, Mohd R., Fui, Lim H., Adam, A., 2010, Cost and Benefit Analysis of Aqularia Species on Plantation for Agarwood Production in Malaysia, International Journal of Business and Social Science, Vol. 1, No. 2, Centre for Promoting Ideas, USA

Meyer, Werner P., 1987, Vegetative Soil Conservation Measures, A Field Manual, Vol. 1, Tinau Watershed, Project, Tansen, Palpa, Nepal

Meyer, Werner P., GTZ & SDC, 1999, GREEN ROAD CONCEPT - Green Roads in Nepal - Best Practices Report. An innovative approach for rural transport infrastructure development in the Himalayas, Kathmandu

MoFSC, GoN, 2015, Forest Policy, Nepal

MoFSC, GoN, 2015, Forestry Strategy, Nepal

MoFSC, GoN, 2015, Community Forestry Development Guideline (Revised), Nepal MoFSC, GoN, 2015, Programme of Forest decade (10 year) procedure, Nepal MoPPW, GoN, 1974, 2002, Roads Board Act, Nepal

Ojha G., Shrestha R., 2007, Bio-engineering measures for stabilizing cut-slopes of Dipayal-Mellekh road, Far Western Nepal, Tribhuvan University, Kathmandu, Nepal,

Panday KK. 1982, Fodder Trees and Tree Fodder in Nepal, Swiss Development Cooperation, Berne, Switzerland

Pandey G. & Branney, P. (2018, 2019). Progress Reports of Participatory Approach for Roadside Protection of Rural Roads in Nepal.

Pollunin O. and Stainton A. 1984, Flowers of the Himalayas, Oxford Univ. Press, Delhi, India

Ra K. and Kimsun T., 2012, Financial Viability of Plantation of Fast-Growing Tree Species in Cambodia, A Project Report, Cambodia

ReCAP, Inception Report (2018). Participatory Approach for roadside protection of rural roads in Nepal. ReCAP, Final Pilot study report 2016

ReCAP (2016). Developing a participatory approach for the roadside protection of rural roads in Nepal. Final report. ReCAP-UKAid.

Regmi P.P., 1982, An Introduction to Nepalese Food Plants, Royal Nepal Academy, Kathmandu

Sahidbhumi, Pakhribas and Dhankuta Rural/Municipalities 2075. Annual programme, policy and budget for FY 20175/076,

Schaffner R. 1987, Vegetation of Stabilizing and Eroding Slopes in Eastern Nepal, PhD of the Swiss Federal Institute of Technology (ETH), Switzerland

Schaffner R. 1999, Regeneration of vegetation on stabilizing and eroding slopes in eastern Nepal: an evaluation 14 years after the first survey, Bulletin of Geo botanical Institute ETH, Switzerland

Schaffner R. 1987, Road Construction in the Nepal Himalaya: The Experience from the Lamosangu – Jiri Road Project, ICIMOD, Kathmandu

Shrestha H. R. 2018. "Developing Sustainability Criteria for Urban Transportation: The Case of Kathmandu Valley", PhD Dissertation, Dr. K. N. Modi University, Rajasthan, India. 18 August 2018.

Annexes

Annex 1: Activities and milestones for July 2017 to June 2020

S. N	Activities and Milestones	Milestone #	2017						2018												2019												2020					
			Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	PHASE - I START UP																																					
1	Meeting of the project team with HELVETAS																																					
2	Kick-off meeting with DoLIDAR																																					
	PHASE - II PREPARATORY ACTIVITIES																																					
3	Preparation for site visit to Kailali & Dhankuta (ReCAP, DoLIDAR & DCC)																																					
4	Preliminary meeting with DCC/DTO Kailali & Dhankuta, & other district Offices																																					
5	Reassess the Pilot sites as suggested by phase -1 & interaction with LRUCs &																																					
6	Meeting with DCC/DTO and confirmation of selected Roads and Pilot sites																																					
7	Review proposed design and cost estimate of civil engineering structures as needed and review bioengineering needs																																					
8	**Preparation, Submission & Presentation of Inception Report Phase**	**1**																																				
	PHASE - III IMPLEMENTATION - PLANTATION																																					
10	Identification of road-side land users & settlement of RoW issue					1	1						# 2																									
11	Formation of User Groups (UG)																																					
12	Establishing MoU among UG , municipalities and HELVETAS																																					
13	Preparation of participatory plantation plan												1																									
14	Conduction of Socio-economic Baseline Survey of beneficiaries						2																															
15	**Preparation & Submission of Baseline Survey Report**	**2**								Site					Site																							
16	**Preparation & Submission of Site Plantation Report**	**3**																																				
17	Development of Plantation training materials																																					
18	UGs Training on plantation, plant management & financial literacy																																					
19	Site preparation for Plantation																																					
20	Collection and preparation of plant saplings for plantation																																					
21	Construction of civil structures (if required) by municipalities																																					
22	Plantation and site protection (fencing in site # 1 only)																																					
23	Organisation of first knowledge sharing workshop																																					
24	**Preparation & submission of first knowledge sharing workshop report**	**4**																																				
	PHASE - IV FIELD IMPLEMENTATION - PLANTATION GROWTH, MAINTENANCE & HARVESTING																																					
25	Plantation maintenance i.e. manuring, watering, weeding etc.																																					
26	Plant growth monitoring; disease treatment and UG backstopping																																					
27	UGs 2nd Training on fire protection, composting, market linkage																																					
28	UGs Exposure Visit to successful plantation sites/nurseries																																					
29	Monitoring of the Road slopes and sides together with municipality																																					
30	Harvest & sale of products, linkage to traders, keeping records etc.																																					
31	**Quarterly Progress Reports**	**5 - 11**													5			5			4			4			4			6			2					
32	Mid-term evaluation																																					
33	**Submission of field implementation report**	**12**																													10							
	PHASE - V PILOT STUDY COMPLETION & DOCUMENTATION																																					
34	**Submission of Revised Draft Manual & Pilot Study Report**	**13**																																				
35	Organisation of second knowledge sharing stakeholders' workshop																																					
36	**Submission of second workshop report on knowledge sharing**	**14**																																				
37	**Submission of training materials**	**15**																																				
38	Organization of national level training course (3 Days,75 participants)																																					
39	**Submission of training course report (National level)**	**16**																																				
40	**Submission of final pilot study report**	**17**																																				

Annex 2: Sample Agreements between Project, Local Communities and Local Governments (Unofficial translation)

Table 11: Roles of the different stakeholders in Rural Roads

Stakeholders	Roles
Federal Government (DoLI)	- Create an enabling environment for the pilot study - Facilitate and organise knowledge-sharing workshops and trainings of district staff - Joint monitoring of project works on-site with the project team - Facilitate and resolve any issues arising between the project and the district - Support the preparation of the RoW Utilisation Manual and promote and replicate the approach based on project experiences on other roads in Nepal
Provincial Government/Roads Division	- Joint monitoring of project works on-site with the project team - Facilitate and resolve any local issues together with Local Governments
Local Government (Rural/Municipalities)	- Provide land (RoW) with user-rights to the User Groups - Invest in civil structures, if needed - Implement memorandum of understanding between the Municipalities and User Groups - Take decisions on benefits-sharing mechanisms - Joint monitoring of project works on-site with the project team - Facilitate and resolve any local issues together with User Groups
User Groups	- Implement project activities within the RoW - Contribute labour for site preparation, plantation works, maintenance and harvesting - Manage assets created e.g. the RoW plantation - Plan and organise benefit-sharing with local households (user group members)
Project Team (Helvetas Nepal)	- Provide expertise for project technical and other inputs - Manage the project budget and prepare reports as required by ReCAP - Facilitate and build capacity of Local Governments and User Groups - Conduct baseline study - Invest in plant saplings, irrigation and fencing as needed - Support user groups in maintaining the plants and road slope, and for harvesting and selling of products - Support institutional development of user groups - Conduct regular site monitoring and reporting (for ReCAP and other stakeholders) - Organise two knowledge sharing workshops and trainings for technical persons at Local Government level - Finalise the RoW Utilisation manual with support from DoLI - Document the learnings from the project
ReCAP	- Provide resource for project implementation as outlined in the project agreements - Provide technical guidance for the project team

Action Research

Participatory Approach for Roadside Protection of Rural Roads in Nepal

Agreement between

Users' Committee, Local Governments (Municipality and Rural Municipality) of Pilot Project Areas

and

Helvetas Swiss Intercooperation Nepal

2018

Agreement

between Local Government and Users groups

for

Participatory Roadside Protection Programme

Agreement No.

Background:

This project has been implemented with the objective of seeking possibilities for economically benefiting from the rural road and its Right of Way land through adopting participatory approach. The action research will be done by mobilizing the community and also with the objective to protect and sustain roadside lands.

In this project, respective stakeholders (decision makers and policy level) participation and knowledge sharing on related research and its result and for possible extension of Right of Way. The role of stakeholders is significant. This programme has been implemented with the support of UK Aid through its program named Research for Community Approach Partnership, (ReCAP)

This agreement is prepared and entered into force between Roadside Protection Programme implemented by Helvetas Swiss Intercooperation Nepal (hereinafter referred as Helvetas) and Gararkhola Road Side Protection Users' Committee (hereinafter referred as Users' Committee), Pakhribas and Dhankuta municipality (hereinafter referred as municipality).

1. Parties to the agreement

Users' Committee: Marga/Dharmashal Roadside Protection Users' Committee

Municipality: Pakhribas and Dhankuta Municipality

Programme implementing organisation: Helvetas Swiss Intercooperation Nepal

2. Detail of plan in general:

2.1 Name of plan: Action Research, Participator Roadside Protection Programme

2.2 Address: Pakhribas (9,10) / Dhankuta Municipality (Ward no. 10)

2.3 Protecting area: Dharmshal to Marga (within 2.1 km area)

2.4 Beneficial from the plan

i) Total households: 37 (4 dalit: 4 Janjati: 32 Other:1)

2.5 Users' Committee detail

Total no. of members: 7 (women:2 male:5 dalit:0 Janjati:6 Other:1)

2.5.1 Formation date of Users' Committee: 2074/7/19 (2017/11/05)

3. Major activities of plan and responsible stakeholders

S/No.	Particular	Role		
		Users	Rural Municipality	Helvetas
1.	Organise workshop on orientation on participatory roadside protection programme	√	√	√
2.	Identification of Roadside Protection Programme area	√	√	√
3.	Identification of users of roadside protection programme area	√	√	
4.	Formation of roadside protection programme area Users' Committee	√	√	
5.	Survey of basic socio-economic detail of users of roadside protection programme area	√		√
6.	Procurement and transportation of required materials for roadside protection programme	√		√
7.	Procurement of tools for bamboo cutting and fencing for plant ……	√		√
8.	Clearance of plantation site	√		
9.	Prepare pit for sapling plantation	√		
10.	Repair maintenance of potholes on the road	√	√	
11.	Monitoring of roadside protection programme		√	√
12.	Market coordination for the products produced from roadside protection area	√		√
13.	Organize training/workshop on skills and knowledge related to roadside protection	√	√	√
14.	Study/observation tour on roadside protection area	√	√	√
15.	Prepare, progress report related to programme			√
16.	Interaction and coordination with local stakeholder related to programme	√	√	

4. Budget release

Roadside Protection Programme, Helvetas Swiss Intercooperation Nepal will release the budget to the Users' committee based on the completion of the work.

5. Responsibilities of the agreement parties

i) Responsibility of Users' Committee

- Support site selection process of roadside area for action research.
- Support in identifying landlord or users of roadside protection area and support in formation of committee.
- Participate and support in household survey of roadside users
- Support in preparing tree planting work plan of road protection
- Support in materials (bamboo, broom, grass plants, compost etc.) for road protection tree planting including procurement process
- Support of necessary works on roadside protection programme for eg. bush cleaning of tree planting area (75% community contribution, prepare land (50% contribution), seedling planting (50% contribution),

prepare fence (50% labour), weeding, management of compost fertilizer (60% labour contribution), and necessary repair/maintenance of potholes on the road (25% labour contribution)

- Support in the process of solving problems or disputes arise in the community particularly during plan implementation of Right of Way of road
- Support in conducting activities by coordinating with the supporting local level stakeholders regularly
- Support in the capacity building training/workshops conducted by Helvetas Nepal
- Necessary support in Amrisho protection, irrigation, caretaker, harvesting (collection) and selling
- Nominate one responsible person for roadside protection programme
- Distribute profits received from roadside protection programme in a practical and justifiable manner

ii) Responsibility of municipality:

- Take the lead role in the selection process of roadside area for roadside protection action research
- Necessary support in the formation process of users' committee of roadside protection area
- Necessary support in tripartite agreement signature and other to conduct roadside protection work
- Support in roadside protection programme for eg. basic repair maintenance work of road
- Support in the process of solving problems or disputes arise in the community particularly during plan implementation of the RoW of the road
- Coordinate and support in training/workshops related to knowledge, skill improvement conducted by supporting organization
- Include and document the plan in municipality programme
- Monitor the roadside protection plan work and provide suggestions to users' committee and relevant stakeholders
- Support in coordination with local level supporting stakeholders and conduct the activities
- Necessary support in distribution system of profit made from roadside protection work

iii) Responsibility of Helvetas Swiss Intercooperation Nepal

- Orientation on participatory roadside protection programme to concerned municipality and users.
- Facilitate in roadside area selection process for seedling of plant
- Necessary support in formation of users' committee of roadside protection area
- Necessary support in tripartite agreement signature and other to conduct roadside protection work
- Provide required materials for roadside protection work according to the agreement
- Coordinate and communicate between Helvetas Nepal and Users' Committee to conduct roadside protection work
- Support in interaction process between users' committee, Helvetas Nepal and concerned line stakeholders after monitoring the plan and quality.
- Release the budget after executing the activities completion by the users' committee.
- Facilitate and develop distribution system of profit from the roadside protection work
- To implement programme achievements at policy level, provide necessary technical service to municipalities.

7. Duration of Agreement

The duration of this agreement will be from 1 Jeshta 2075 (15 May 2018) to 18 Ashad 2077 (30 June 2020).

8. Amendment

The amendment to this agreement shall be made in written agreement of project construction related parties.

9. Termination

This agreement may be terminated at any time if the actual work cannot be done during the project implementation period or if it is out of control of the parties.

For the project construction of the above-mentioned detail, this agreement has been done between the parties as mentioned below.

	Signature
From Users' Committee, Dharmashal, Marga Name: Chandra Shrestha Position: Chairperson	==========
From Pakhribas Municipality Name: Birkha Rai Position: Chief	==========
From Dhankuta Municipality Name: Chintan Tamang Position: Chief, Dhankuta Municipality	==========
From Helvetas Swiss Intercooperation Nepal Name: ……. Position:	==========

Dhankuta/Pakhribas Municipality Officials (witness)

Name	Position	Signature
Mr. Hari bahadur Khatri	Ward Chairperson	
Mr. Kamal Bahadur Karki	Ward Chairperson	
Mr. Chandra Lal Ghising		

Action Research

Agreement between

Garakhola Krishi Sadak Samuha

and

Participatory approach for roadside protection of rural roads in Nepal/

Helvetas Nepal

March 1, 2019 to 31 December 2019

Agreement for
Participatory roadside protection programme in rural roads

Agreement No. 1

This project has been implemented with the objective of seeking possibilities for economically benefiting from the rural road area Right of Way in the land of rural road areas through participatory approach, the action research will be done by mobilizing the community and also with the objective to protect and sustain roadside lands.

In this project, respective stakeholders (decision makers and policy level) participation and knowledge sharing on related research and its result and for possible extension of Right of Way the role of stakeholders is significant. This programme has been implemented with the support of UK Aid through Research for Community Approach Partnership (ReCAP).

This agreement is prepared and entered into force between Garkhola Krishi Sadak Samuha (hereinafter referred as Road Users Group) and Roadside Protection Programme implemented by Helvetas Swiss Intercooperation Nepal (hereinafter referred as support organization) to collaborate various annual activities.

Detail and terms & conditions of collaborative agreement

Programme: Action Research, Participatory roadside protection programme

District: Dhankuta

Road area: Area police office to Samba village under Hile to Chintang area

(Region within 1km area)

Address: Shahidbhumi Rural municipality, ward no.: 2 and 3, Area: Chintang

1. Detail of collaborative group:

i) Group name: Gaarakhola Krishi Sadak Samuha

ii) Address: Shahidbhumi rural municipality, ward no.: 2 and 3, area: Chintang

iii) Contact person: Khadga Bahadur Rai, Position: Chairperson

Phone No.: 9816324329

Surja Bahadur Rai: 9842220412

iv) Bank name/address: Citizen Bank International Ltd., Piple branch, Dhankuta

Account name/type: Current

Account No.: 0740000093 CA Shree Gaarakhola Krishi Sadak Samuha

2. Objective of the programme

The action research will be done by seeking possibilities for economically benefiting from the rural road Right of Way by mobilizing the community through participatory approach as well as protect and sustain roadside lands.

3. Activities of the agreement period

The main activities of the plan will be as mentioned in the plan proposal Annex 1

4. Programme implementation area:

i) Area police office to Samba village under Hile to Chintang area (Region within 1km area)

5. Target group:

i) Total household: 17 (Dalit:0 Janjati:17 Other: 0)

6. Duration of agreement and implementation:

The duration of the agreement will be from 1 March 2019 to 31 December 2019.

7. Expected outcomes of agreement period:

- Weeding and fertilizing will be done in the land where amrisso has been planted.
- Composting is done and applied in the plants.
- Coordination with municipalities will be done with written proposal to access fund for additional new activities
- Additional budget will be managed to conduct training on broom making, ginger processing.
- The produced products/materials will be marketed in connection with businessmen.
- While conducting activities/programmes, income generation activities will be promoted in coordination with local level
- Regularly monitoring of the programme, replacing new plants to the dead plants and fencing will be done to protect from the roaming cattle
- As the facilitator is already selected, they will be mobilized according to the agreement.
- For organizational development, various training, orientation and study tour will be organized to gain additional knowledge.

8. Responsibility and commitment of supporting organization:

8.1 Financial support:

To conduct and implement the mentioned programme, supporting organization will provide a maximum of total Rs. 291,459.00 (In words: rupees two hundred ninety-one thousand four hundred fifty-nine only) to the RUG.

Table 12: Summary of agreed amount

S/No.	Particular	Total amount	Remarks
1	Program and human resource mobilization budget	291,459.00	

8.2 Budget allocation:

In general: Supporting organization provides the budget for the mentioned activities according to the programme proposal. The allocated budget will not be allowed to spend in

any other topic but in emergency cases the budget from one topic can be transferred at a maximum of 10%. If the budget has to be transferred more than that or to transfer from one topic to another, it should be pre-approved with a written request with reason. The detail of the programme is mentioned in Annex 1.

8.3 Budget release:

Supporting organization will provide 30% of the budget upon signing of the agreement. The instalment release will be according to allocated budget. The amount not spent in earlier instalment will be adjusted in next instalment release. 10% of the final instalment will be released after receiving Annual work progress report and expected outcomes and Internal audit.

The programme budget will be released based on achievements. In case of expected outcome is not achieved, the related programme budget will be suspended.

According to budget plan, partial amount of first instalment will be released upon signing of the agreement. Full instalment will be released, if the collaborative group submits required valid documents to supporting organization.

8.4 Support from other organization:

If financial support or grant is received from the other organization for the same programme, the group should inform supporting organization. This type of financial support or grant could be spent in the activities of the programme without duplication.

9. Responsibility and commitment of collaborative group:

9.1 Implementation:

The programme and budget in the integral part of the agreement. Though the collaborative group is full responsible for the execution and implementation of the programme, it will be implemented in close coordination with the supporting organization.

9.2 Financial management and audit:

i) Collaborative organization should keep the financial transaction transparent and clear.

ii) Statement of programme budget expenses has to be submitted to supporting organization on quarterly basis according to English months.

iii) Collaborative organization should provide a clear financial statement (bank statement and detail) of expenses along with original bills and supporting documents according to the table shown as below. While providing original bills to the supporting organization, one copy each of original bills should be kept in the organization.

Duration	Submission date for Financial report
March to May 2019	Till 5 June 2019
June to August 2019	Till 5 September 2019
September to November 2019	Till 5 December 2019
December 2019	Till 25 December 2019

9.3 Progress report:

i) Progress report and financial report has to be submitted to supporting organization on quarterly basis as mentioned in table 1.

ii) Progress report should be submitted according to the format provided by the supporting organization.

10. Common understanding:

10.1. Monitoring and evaluation:

i) Supporting organization will inform the collaborative group for any type of study, participatory review, monitoring and audit, if required.

ii) Both parties can monitor the programme and get updated about the programme. During the monitoring process, supporting organization can monitor and evaluate by including representative from third organization.

iii) Monthly review of the programme will be done and based on above monitoring and progress review and feedback; necessary improvements will be done by both parties.

iv) In consultation and agreement of both parties, change/replacement of the facilitator will be done, if needed.

10.2 Future collaboration and support:

Supporting organization will not assure any support and collaboration in future but in principle: if the work progress is satisfactory and if the fund is available, collaborative support could be continued in future.

10.3 Collaboration with other organization:

If the collaborative group collaborates with other organizations, supporting organization will have no objection. Supporting organization is always ready to support but there should be no duplication in the programme.

10.4 Amendment:

The amendment shall be made in consultation and written agreement by both parties without affecting objective of this agreement, if necessary.

10.5 Termination or halt:

If any party/organization makes serious mistake or does not abide by terms and conditions during programme implementation which is according to agreement, or if both parties are not in a position to conduct the programme, a 30 days written notice will be provided by one organization to another to terminate or halt the agreement.

11. Collaborative organization will conduct the programme following collaborative guideline of AIN and follow Basic Operating Guidelines (BOG) for international organizations working in Nepal.

12. The concerned facilitator working in collaborative organization should not be involved responsible position in any political party or its sister organization. The facilitator will be immediately terminated, if found actively involved in any party. Similarly, officials of supporting organizations should not be in responsible positions of political parties and its sister organizations. If found and programme transparency and service delivery is affected due to the reason supporting organization will not be in compulsory to collaborate with collaborative group.

13. During the programme implementation, collaborative group or in connection with the programme, if staffs are involved with corrupt intention or if found fraud, zero tolerance will be applied.

14. If collaborative group and staffs in connection with the programme are proved to be involved in social, cultural and gender discrimination, zero tolerance will be applied.

We both parties agree to collaborate based on this agreement with terms and conditions and have willingly signed from our organization. The annexes included in this agreement will be integral part of this agreement.

Helvetas Swiss Intercooperation Nepal Collaborative group

Signature: Signature:

Name: Ghanashyam Pandey Name: Khadka Bahadur Rai

Position: Team Leader Position: Chairperson

Date

Organization stamp:

Witness:

Signature: Signature:

Name: Ms. Sashmita Rai Name: Surja Bahadur Rai

Position: Treasurer Position: Secretary

Signature:

Ms. Sushmita Rai

Member Date: March 1, 2019

Organization stamp:

Enclosure:

Annex 1: Programme proposal and budget detail

Annex 2: Documents required for first instalment release

- Organisation registration and renewal
- Fund request letter
- Employment letter and job description of facilitator

Proposal plan and Annex 1

Participatory roadside protection programme

Annual Programme 2019

Users Group name: Gaarakhola Krishi Sadan Samuha, Shahidbhumi rural municipality ward No. 2 and 3, Chintang

Programme duration: 1 March 2019 to 31 December 2019

SN	Activity	Unit no.	Per unit cost	Total Rs.	Cost sharing			Programme conduction month
					Helvetas Nepal	Users group	Other	
1	Weeding and use of fertilizer	68 pax	500	34,000	17,000	17,000		March and June
2	Composting (local and external materials)	1 time	3,000	3,000	2,000	1,000		July
3	Proposal writing and coordination with municipalities/seek source (snack cost)	1 time	3,000	3,000	3,000	-		April
4	Improved cultivation technology training (snack cost)	1 time 2 days	5,000	10,000	10,000	-		Together with rural municipality and Helvetas
5	Broom making training (snack cost, trainer)	-	-	-	-	-		
6	Ginger processing training		-	-	-	-		
7	Marketing and agreement with businessmen for produced products (transport and lunch)	1 time 2 pax 5 days	1000	10,000	10,000	-		Jun/July
8	Regular meeting of group (monthly)	10 times	2000	20,000	20,000	-		
9	Transport, coordination and communication	10 months	1500	15,000	15,000	-		
10	Regular monitoring of the programme by committee member (monthly)	10 times	-	-	-	-		
11	Additional planting to replace death plants	No.	1800	18,000	9,000	9,000		
12	Facilitator mobilization	72 hrs/ month,10 months	19008	19,0080	19,0080	-		
13	Accidental insurance	1 time	1500	1500	1500	-		
	Total Rs.			304,580	277,580	27,000		
	Organisation management cost 5%				13879			
	Grand total Rs.				291,459			

Annex 3: Summary of cost

SN	Description	Actual Contributions in NPR			
		Community	Local Government	Project	Total
A	**Input for field works**				
1.	Cost for fixed inputs (NPR) Including low cost fencing (materials, nails, wire and skilled labour)	30,013	-	335,175	365,188
2.	Fertilizer (compost making materials cost)	20,025	-	30,578	50,603
3.	Land preparation and pit digging, site clearances, slope management	529,073	-	162,547	691,620
4.	Drainage management, road improvement with filling potholes	-	459,000	-	459,000
5.	Seedlings (broom grass)	23,563	-	209,932	233,495
6.	Irrigation (HDPE pipe)	-	-	33,561	33,561
7.	Other labour cost (weeding, plant maintenance)	64,320	-	205,831	270,151
	Total cost for inputs (A)	**666,994**	**459,000**	**977,624**	**2,103,618**
B	**Capacity Building**				-
1.	Business support service	-	-	46,495	46,495
2.	Training facilitator cost	-	-	46,565	46,565
3.	Training material (tools)	-	-	1,900	1,900
4.	Coordination meeting with *Palika* and user committee, consultation workshop etc	-	-	220,200	220,200
5.	Exposure visit for RUGs and municipality representatives to the similar sites in Ilam	-	-	249,660	249,660
	Total cost for capacity building (B)	-	-	**564,820**	**564,820**
	Grand Total (A+B)	**666,994**	**459,000**	**1,542,444**	**2,668,438**

Annex 4: Summary of Baseline Information

Site-1: Hile to Chhintang-Jyamire Bhanjyang in Sahidbhumi Municipality

Demographic	Unit	Women	Men	Total
Beneficiary households	Number	-	-	**17**
Beneficiary population	Number	**64**	**70**	**134**
Population of children with age less than 16 years	Number	**22**	**19**	**41**

Physical Assets	Quantity	
	In number	In per cent
Households with toilets	**17**	**100%**
Households with electricity connection	**17**	**100%**
House in stone-mud wall and CGI roof	**16**	**94%**
House in wooden wall and thatch roof	**1**	**6%**
Households with access to drinking water from community tap stand	**13**	**76%**
Household drinking water from unprotected source	**4**	**24%**
Household with Television	**10**	**59%**
Households with motorbike	**4**	**24%**
Household with its member/s holding mobile phone	**12**	**71%**

Economic Assets	Quantity	
	In Percent	In Number
Households with ownership of own land	100%	**17**
Average area of registered land (median value, mean value and standard deviation from mean)	-	**1.12, 1.35, 0.69 ha**
Minimum landholding	ha	**0.1**
Maximum landholding	ha	**2.6**
Households with food sufficiency less than 3 months	0%	**-**
Households with food sufficiency for 3-6 months	18%	**3**
Households with food sufficiency for 6-9 months	76%	**13**
Households with food sufficiency for whole year	6%	**1**
Households making income from remittance	59%	**10**
Households making income from livestock	65%	**11**
Average annual income from remittance (1 USD = 100 Nepali Rupees) and standard deviation	USD	**2,500, 1523,**
Average annual income from all sources (agriculture, livestock, remittance, labour, and service) median value, mean value and standard deviation	USD	**4,665; 5,853; 5,072**
Minimum annual income of a household	USD	**245**
Maximum annual income of a household	USD	**16,560**
Agriculture labour	Number	**15**
Non-agriculture labour	Number	**4**
Average price of land per hectare	USD	**24,331**
Average price hike of the land adjacent to road after road construction	Fold	**4.73**
Households losing land due to road opening	Percent	**94%**

Social Asset	Percent	Number
Ethnic composition		**All Rai**
Households as a member of local Forest User Group	82%	**14**
Households as a member of School Management Committee	18%	**3**
Households as a member of local Cooperative	6%	**1**
Households as a member of Community Groups	82%	**14**
Households as a member of such entities mentioned above	-	-
Households as a member of three such entities mentioned above	24%	4
Households as a member of two such entities mentioned above	47%	8
Households as a member of one of such entities mentioned above	24%	4
Households as a member of none of such entities	6%	1

Human Assets	Unit	Women	Men	Total
Literate population	Percent	**78%**	**81%**	**80%**
School going children	Number	**21**	**18**	**39**
Households practicing compost preparation	Percent			82%
Households having knowledge on farm yard manure	Percent	**-**	**-**	**0**
Households in which major decisions are taken by both men and women in family	Percent	**-**	**-**	**82%**
Households in which major decisions are taken by men in family	Percent	**-**	**-**	**12%**
Households in which major decisions are taken by women in family	Percent	**-**	**-**	**6%**

Site 2: Hile-Chhintang Ilaka Police Station to Shambu Gaon School in Pakhribas and Dhankuta Municipalities:

Demographic	Unit	Women	Men	Total
Beneficiary households	Number	-	-	**35**
Beneficiary population	Number	**74**	**97**	**171**
Population of children with age less than 16 years	Number			**46**

Physical Assets	Quantity	
	In Number	In Percent
Households with toilets	**35**	**100%**
Households with electricity connection	**35**	**100%**
House in stone-mud wall and CGI roof	**30**	**86%**
House in wooden wall and thatch roof	**0**	**0%**
House in brick-cement masonry	**5**	**14%**
Households with access to drinking water exclusively from community tap stand	**26**	**74%**
Household drinking water exclusively from unprotected source	**4**	**11%**
Household drinking water from both community tap stand and unprotected source	**5**	**14%**
Household with Television	**29**	**83%**
Households with motorbike	**10**	**29%**
Household with its member/s holding mobile phone	**34**	**97%**

Economic assets		
	In Number	In Number
Households with ownership of own land	35	**35**
Average area of registered land (median value, mean value) and standard deviation from mean in hectare	0.5, 0.77, 0.72	**0.5, 0.77, 0.72**
Minimum landholding in hectare	0.05	**0.05**
Maximum landholding in hectare	3	**3**
Households with food sufficiency less than 3 months	**12**	34%
Households with food sufficiency for 3-6 months	**8**	23%
Households with food sufficiency for 6-9 months	**3**	9%
Households with food sufficiency for whole year	**12**	34%
Households making income from remittance	**12**	34%
Households making income from livestock	**30**	86%
Households raising livestock	**33**	94%
Households raising poultry	**30**	86%
Average annual income from remittance (1 USD = 110 Nepali Rupees) and standard deviation in USD	867.5, 1,487.8	
Average annual income from all sources (agriculture, livestock, remittance, labour, and service)- median value, mean value and standard deviation in USD	2,854, 3,399, 3,189	
Minimum annual income of a household in USD	145.5	
Maximum annual income of a household in USD	13,836	

Agriculture labour	31	
Non-agriculture labour	5	
Average price in USD of land per hectare	58,258	
Average price hike in 'folds' of the land adjacent to road after road construction	38.29	**38.29**
Average price in USD of land adjacent to road before road construction	1,522	
Households losing land due to road opening	No compensation	100%

Social Asset	In Number	In Percent
Ethnic composition (Janajati, Brahmin, Dalit)	**232, 1, 2**	91%, 3%, 6%
Households as a member of local Forest User Group	**22**	63%
Households as a member of School Management Committee	**0**	0%
Households as a member of local Cooperative	**0**	0%
Households as a member of Community Groups	**27**	77%

Human Assets	Unit	Women	Men	Total
Literate population	Percent	**82%**	**94%**	**89%**
School going children	Number	**13**	**29**	**42**
Children going to Govt. schools	Number	**8**	**18**	**26**
Children going to Pvt. Schools	Number	**11**	**5**	**16**
College going	Number	**3**	**3**	**6**
School going population (by age)	Number			**35**
Households practicing compost preparation	Percent			97%
Households having knowledge on farmyard manure	Percent			**91%**
Households in which major decisions are taken by both men and women in family	Percent			**100%**
Households in which major decisions are taken by men in family	Percent			**0%**
Households in which major decisions are taken by women in family	Percent			**6%**

Annex 5: Recommendations of the Mid-term Review and Management Response

The project management team appreciates the efforts of the evaluation team who identified the key issues and problems as well as the positive achievements made at the project sites. The following actions will be taken in response to the MTR recommendations for enhancing successful project implementation and in order to better achieve the project outcomes. So far, the project has not faced any significant implementational problems.

Recommendations from the MTR	Management response	Timeframe & Present status
1.Project team Coordination mechanisms should be established between neighbouring palikas at the project sites for sustainability of the plantation areas and also to continue to use these research sites as demonstrations.	The coordination mechanism has already started. Regular meetings and sharing mechanisms are taking place amongst the project palikas and with the project team each quarter.	Every quarter. (Completed)
Replacement plantation of amrisso should be carried out where the planted saplings have died.	Replantation work has already been carried out where planted saplings have died (see Progress Report 5 for more detail).	July 2019 (Completed. See progress report 05)
In order to quantify the economic value of the broom-grass the project should continue its activities for at least a further 2 years (using additional resources from wherever available).	This issue was discussed internally (between the project team and Helvetas) and a solution will be found soon to ensure an additional two years of support	September 2019
Training, exposure visits and technical knowledge enhancement for technical persons at palika/local level is required.	On-site learning, good governance practices and project progress are shared from time to time with palikas. The project team will discuss with palikas to identify means of providing capacity building for technical staff of the palikas.	(Discussed with the Helvetas team and exploring possibilities)
Training for local beneficiaries to enhance their skills and knowledge on the productive use of RoW and on plant species is required.	The project team have already started to train local beneficiaries on RoW management and cost analysis of profitable crops and its market system etc (see Progress Report 05 for more detail)	Done. October 2019 and January 2020
Joint monitoring of the project sites, involving representatives from Local and Provincial Governments alongside the project team should be carried out.	Joint Monitoring visits were conducted earlier in 2019 and will continue in early 2020.	June 2019 (Done. See progress Report 05)

Recommendations from the MTR	Management response	Timeframe & Present status
Knowledge sharing workshops to support the institutionalisation of project results/outputs and to share project learning are still required.	A second knowledge sharing workshop is already scheduled to be conducted.	January 2020 (Planned for December 2019)
Capacity enhancement and support should be provided for the palikas to formulate their own plans and strategies for rural roads.	This issue will be discussed with the palikas. If they wish to get technical support from project, then project team will provide it.	12-13 Dec 2019. Process orientation imparted during consultation workshop
The project should prepare the RoW land management procedural guidelines as part of wider guideline covering rural road governance for Local Governments.	The project team has already started working on this manual including responding to the MTR recommendation to broaden the scope to cover rural road governance as well as RoW management.	November 2019 (exploring with them, project team is ready to support) December 2019 (working on it)
Explore the possibility of replicating the project approach.	This will be discussed in our second learning sharing workshop	February 2020 Discussed and some of the Palikas have initiated to replicate the approach
2. Palikas/Municipalities The Thematic Committees of the municipalities that are responsible for roads, (Infrastructure Development Committees) should become more active and functional.	The project team will conduct meetings in each working palika/municipality and discuss these recommendations. If palikas wish to get support for those aspects, the project team will provide it.	September 2019 (Meeting conducted and officially informed regarding this matter. If they wish to get support from project, the team is ready to support them)
The relationships between the Thematic Committees and the relevant sector offices in each palika should be developed and supported to ensure that decisions are technically valid and made through an open and transparent way.		September 2019 (Palika agreed these recommendations and said that they will incorporate them in their policy as far as possible)
Palikas should develop their own monitoring systems and grievance redress systems and a proper communication system among the road users/committees and neighbouring palikas.		

Recommendations from the MTR	Management response	Timeframe & Present status
Committees should be made more effective and active for monitoring and redressing complaints.		
Funding for rural roads should be based on the Transport Master Plans of the palikas to ensure optimum utilisation of resources		
Local Governments should prepare their stakeholder communication strategies and implement these.		
Meaningful consultation mechanisms with local stakeholders and road neighbours of rural roads should be institutionalised within the planning and implementation processes of local government.		
Participating palikas should be involved in the preparation of the planning guidelines on rural road governance for Local Governments that will be produced by the project. This will ensure their commitment, integrate their ideas and ensure the relevancy of the guidelines.	The project has started preparing materials for the rural road governance and RoW utilisation Manual. Drafts will be shared at the second knowledge sharing workshop (Dec 2019) to get feedback from the local, province and central level governments before finalizing.	Planned for 2nd week of December 2019 Done
The guideline should also include aspects of local Revenue Raising for rural road maintenance as this will ensure sustainability of the project approach.		January 2020 Going on
3. Provincial Government Provincial Government should work together with the palikas on road type classification to maintain uniformity and clarity for any future up-scaling of roads and road construction.	This issue will be re-emphasized and discussed with provincial government soon	October 2019 (These issues were discussed with the provincial government on 24 October 2019 and they agreed to resolve the problems in near future.
Provincial Government should work with the palikas to prepare RoW maps incorporating terrain, slope class, ownership, climate, etc. In future, during the detailed/feasibility study for new road projects, RoW land mapping shall be included		
Provincial Government should work with the palikas to carry out awareness campaigns for enforcing the legal provisions for RoW management and to ensure that the RoW land is clear for other locally beneficial uses		

Annex.6. The Janakpur Commitment

Key points of commitments among Local level for horizontal learning: *(unofficial translation)*

1. The participants of the workshop continue communication and build network

2. Increase capacity of the local governments and develop resource persons to promote good governance practices, better service delivery, good practices and innovations among the stakeholders.

3. Dissemination of horizontal learning and good practices to local, province and federal level.

4. The local government's associations as, MuAN and NARMIN identify and respect with award those local governments who develop the replicable innovation.

5. Provide opportunity to the local governments as resource institutions those who have replicable innovations.

6. Increase coordination among neighbour local governments and accumulate resource for joint innovative actions.

7. Municipality Association of Nepal (MuAN) and national Association of Rural Municipality of Nepal (NARMIN) coordinate among the local institution, private sector and sectoral experts for the institutionalization of good practices.

22 February 2020
Janakpur, Province no 2
Nepal

Annex 7: Legal matrix on the utilisation of RoW public land in Nepal

Public land	Legal instruments	Operating instruments	Contracting entities	Responsible government agencies	Implementing communities	Activities	Benefit sharing
Public land (owned by local bodies and other institutions)	FR, 1995 (Rule 26.2)	Bylaws of CFUGs and Forest Operational Plan	Owner of public land and CFUG	Owner of public land and DFO	CFUGS	Plantation, conservation and utilisation of products	Based on contract and operational plan
Riversides land	FA, 1993, 1995 (Sect. 31)	Operational plan approved by DFO	DFO and poor community-based leasehold forest group	DFO	leasehold forest group	Plantation, river flood control, bio-engineering, cash crops	Based on approved lease certificate
Irrigation channels	IR, 2000 (Rule 12)	Community Forestry Work-Plan	Irrigation Water User Association, DFO and Irrigation Office	DFO and Irrigation Office	Irrigation Water User Association	Plantation of tree or NTFPs, use, marketing and income generation	Based on approved work-plan
RoW under high-tension lines	EA, 1992 (Sect. 24), ER, 1993 (Rule 50) and EPR, 1997	EIA report, Environmental Management Plan and Forest Management Plan	Local community (CFUG), DFO, project developers and contractor	DFO, project developers and contractor	Local community (CFUG), DFO	Harvesting of medicinal & aromatic plants in RoW of electricity line	100% income for poor communities (households)
Row of public road (land acquired for public interest)	PRA, 1974 (Sect. 16.4)	Plans of local bodies, agreement paper, operational plan	Local institution (communities), local bodies and DoLI/DCC, Local Levels	Local bodies, DoR, DoLIDAR, DDC, DFO, Agricultural Knowledge centre	Poor groups, groups of landless people, local communities	Plantation, agro-forestry, agriculture (cash crops), bio-engineering	Based on agreement between communities and Local levels

Annex 8: Optional plants for productive use of RoW considered for wider replication

Nepali name	Scientific name	Altitude (m asl)	Site conditions	Growth hight (m)	Productive use	Propagation	Comments
Trees, shrubs							
Ainselu	*Rubus ellipticus*	1'000-2'500	varied	1-3	berry	seeds, root cutting	
Alainchi	*Elettaria cordomomum*	1'000-2'000	moist	1-2	spice	seeds, polypods	highly priced spice crop
Amala	*Phyllanthus emblica*	Terai-1'500	hot and dry, harsh	1-2	fruit, medicinal	seeds, polypods	
Amba/Ambak	*Psidium guajava*	Terai-2'000	Varied and dry	2-4	fruit	seeds, polypods	
Bainsh	*Salix tetrasperma*	Terai-2'700	moist	5-8	fencing	Hardwood cuttings	
Ban chutro	*Berberis aristata*	1'500-3'000	Varied and dry	2	berry	seeds, polypods	
Ban silam	*Elsholtzia blanda*	Terai-1'500	varied	2	oil seed		
Bayer	*Zizyphus mauritiana*	Terai-1'200	hot and dry, harsh	3	fruit, fodder	seeds, polypods	
Bhui katahar	*Ananas comosus*	Terai-1600	hot and dry, harsh	1	fruit	stem cutting	Processing industry in place
Cafi	*Coffea spp.*	Terai-2'000	Varied	2	beverage	seeds, polypods	Processing industry in place
Chiya	*Camelia sinensis, C spp.*	Terai-2'000	varied and moist	2	beverage	Hardwood cuttings	Processing industry in place
Chutro	*Berberis asiatica*	1000-2'500	varied and dry	1-2	berry	seeds, polypods	

Nepali name	Scientific name	Altitude (m asl)	Site conditions	Growth hight (m)	Productive use	Propagation	Comments
Dhanyero	*Woodfordia fruticosa*	Terai-1'500	hot and dry, harsh	1-3	fodder	seeds, polypods	
Ghangaru	*Pyacantha crenulata*	1'500-2'500	varied	1	hardwood cuttings for fencing	Hardwood cuttings	
Ghurmiso	*Leucosceptrum canun*	1'000-2'500	varied	2-3	fodder, hardwood cuttings for fencing	Hardwood cuttings, seeds	
Kanda phul	*Lantana camara*	Terai-1'750	hot and dry	2	flower	Hardwood cuttings	ornamental use
Kera	*Musa paradisiaca*	Terai-1'500	varied	3	Food and fibre	Seeds, saplings	Processing industry in place
Kettuke	*Agave americana*	Terai-2'400	hot and dry	1	root suckers for bio- engineering	root suckers	suckers for bio-engineering
Kimbu	*Morus alba, Morus spp.*	Terai-2'000	varied, and dry	3	fruit, leaves, fodder	Hardwood cuttings, seeds	silk production?
Lalupate	*Poinsettia pulcherrima*	Terai-1'500	varied	2	flower	Hardwood cuttings, seeds	ornamental use
Neem	*Azadirachta indica*	Terai-2'000	Varied, dry	2	medical		
Pate Siuli	*Opuntia ficus Indica*	Terai 1'800	hot, dry, harsh	1	fruit, fencing	offshoot, cutting	
Rahar	*Cajanus cajan*	Terai-1'500	Varied and dry	2	vegetable	seeds	as border crop
Kadam/Sajiwan	*Jatropha curcas*	Terai-1'000		1.5	bio-diesel	Hardwood cuttings	
Sahijan	*Moringa oleifera*	Terai-1000	sandy soil, drylands	5-8	food, medicinal, cosmetic	cuttings	often in hedges

Nepali name	Scientific name	Altitude (m asl)	Site conditions	Growth hight (m)	Productive use	Propagation	Comments
Simali	*Vitex negundo*	Terai-1'750	hot and dry varied	2	fencing	cuttings	often in hedges
Siuli/Sihundi, Siyuri,Siurdi	*Euphorbia royleana*	900–1'800	varied	1-2	medicinal, fencing	cuttings	often in hedges
Rudraksha	*Elaeocarpus ganitrus*	Terai-2'000	varied	15-60	medicinal, religious	seeds	very valuable crop
Utis	*Alnus nepalensis*	900-2'700	stony, poor, rather damp	5-10	firewood, timber, fodder	polypod seedlings	timber industry
Grasses, herbs, legumes							
Amrisso	*Thysanolaena maxima*	Terai-2'000	stony, poor, ratherdamp	1.5	brooms, fodder	rhizome cuttings	processing industry in place
Babyo	*Eulaliopsis binata*	Terai-1'500			rope, paper, fodder	slip cuttings	
Napier grass	*Pennisetum purpureum*	Terai-1'500	varied	1.5			bio-engineering
Kagati ghans	*Cymbopogon citratus*	Terai-1'500	stony, poor, rather dry	1	medicinal, cosmetical	slip cuttings	oil, cosmetics
Phurke	*Arundinella nepalensis*	700-2'000	stony, poor, rather dry	1	thatch, fodder	seed, slip cuttings	
Bamboo species							
Choya/Tama bans	*Dendrocal amus hamitoni*	300-2'000			various	culm cuttings	thin culm, heavy branching

Nepali name	Scientific name	Altitude (m asl)	Site conditions	Growth hight (m)	Productive use	Propagation	Comments
Dhanu bans	*Bambusa balcooa*	Terai-1'600			various	culm cuttings	thick culm, heavy branching
Kalo bans	*Dendrocalamus hookeri*	1'200-2'500			various	culm cuttings	heavy branching, brown hairs
Mal bans	*Bambusa nutans*	Terai-1'500			various	Traditional method	strong, straight culms
Nobha/Ghopi/Lyas bans	*Ampelocalamus patellaris*	1'200-2'000			various	Traditional method	smaller, bluish culms
Tharu bans	*Bambusa nutans*	Terai -1'500			various	Traditional method	strong, straight culms

Sources: DoLIDAR et al, 2013; PANDAY, 1982; DEVKOTA et al, 2014

Annex 9: Cost Benefit Analysis

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Undiscounted Flows													
Costs	-884824	-92800	-13500	-144448	-228595	-332702	-411946	-332702	-411946	-494120	-411946	-494120	-515454
Benefits	0	0	23650	499027	805281	1514805	1961918	1514805	1961918	2005099	1961918	2005099	2043555
Net Cash Flow	-884824	-92800	10150	354579	576686	1182103	1549972	1182103	1549972	1510980	1549972	1510980	1528101
BC Ratio								**4.55**					**3.96**
Discount Factors													
Discount Rate	9.5%												
Base Year	2018												
Year Index	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00
Discount Factor	1.00	0.91	0.83	0.76	0.70	0.64	0.58	0.53	0.48	0.44	0.40	0.37	0.34
Discounted Flows													
Costs	-884824	-84749	-11259	-110019	-159005	-211342	-238977	-176261	-199309	-218326	-166226	-182086	-173468
Cumulative Costs	-884824	-969573	-980832	1090851	1249856	1461198	1700175	1876436	2075745	2294071	2460297	2642383	2815851
Benefits	-	-	19724	380086	560133	962246	1138141	802524	949222	885949	791662	738891	687728
Cumulative Benefits	-	-	19724	399810	959943	1922189	3060330	3862854	4812076	5698025	6489687	7228578	7916306
Net	-884824	-84749	8465	270066	401128	750904	899164	626262	749913	667623	625436	556805	514260
Cumulative	-884824	-969573	-961108	-691041	-289913	460991	1360155	1986418	2736331	3403954	4029390	4586195	5100455
Cumulative BCR								**2.06**					**2.81**
NPV (NPR)	5100455												
IRR	44%												

Notes:

Discount rate: It is determined based on the present interest rate of Fixed Deposit

The CPI and WPI rates are assumed as fixed for the period 2025 to 2030 since those rates are already averaged for 11 years.

The seedling of new plants (replantation) is assumed to take place by 25% in 2025 and 20% in 2026.

The yield of broom flower and Grass for cattle will decrease by 10, 15, 20, 25 & 30 percent respectively in 2025, 2026, 2027,2028, 2029 & 2030

The quantity of plant maintenance, Harvesting and any other costs is decreasing by 5% since the yield of broom is declining.

Annex 10. Course Content and Process for RoW Utilisation Manual Training

The following section contains the specific content of the course organized according to the following format:

Skill or Concept: (What is to be done or learned.)

Expected performance: A written statement describing what the participants will be able to do at the end of the training.

The course instructor may modify this content. If modifications are made, all participants will receive written notice of the changes.

Skills/Concepts	Expected performance (**Note:** All performance must conform to the criteria provided or given out by the instructor)
A. Overview of local roads in Nepal and legal aspect on utilisation of Right of Way (RoW)	• Describe constitutional provision related to road/infrastructure • Explain the technical aspects/ road geometric design standards of local roads • Explain legal aspects on utilisation of right of Way
B. Site and Plant selection	• Coordinate with concerned stakeholders • Develop site selection criteria • Develop plant selection criteria
C. Detail survey of the selected site	• Conduct detail survey of the selected site • Perform cost benefit analysis
D. Formation and mobilization of User's Committee	• Form and mobilize User's committee for plantation
E. Site preparation and carryout Plantation	• Prepare site for plantation • Perform the plantation activities
F. Plant maintenance, composting and harvesting	• Explain plant maintenance activities (watering, mulching, weeding, protection from animals etc) • Determine Harvesting time
G. Harvesting, value addition marketing	• Explain Value Chain Development
H. Field observation and interaction with User Committee	• Walkover survey along the selected road section to identify the locations of plantation or observe how the plantation in ROW is being carried out. • Interact with Users committee members
I. Identify key action point and prepare action plan	• Discuss on the observations and findings of field visit • Identify key action points • Prepare action plan

COURSE OUTLINE

Total 15.5 hrs with 9 sessions are allocated for the training program. The detail of session is given in following table:

COURSE CONTENT

Session	Topics	Duration (hrs)
	Registration	1.0
Session 1	Opening, Introduction and Course information	1.0
Session 2	Overview of local roads in Nepal and legal aspect on utilizing Right of Way	1.0
Session 3	Site and plant selection	1.5
Session 4	Detailed survey of the selected site	1.0
Session 5	Formation and mobilization of User's Committee	1.0
Session 6	Site preparation and carryout plantation	1.0
Session 7	Plant maintenance, composting and harvesting	1.0
Session 8	Harvesting, value addition marketing	1.5
Session 7 & 8	Field observation and interaction with User Committee	4.0
Session 9	• Reflection of the field visit • Identify key action point and prepare action plan • Debriefing and closing	1.5
	Total:	**15.5**

RIGHT OF WAY UTILISATION MANUAL TRAINING SCHEDULE

<table>
<tr><th>Date Day →
 Time ↓</th><th>Day I</th><th>Day II</th><th>Day III</th></tr>
<tr><td>9:00-10:30</td><td>Arrival of Participants</td><td>Detailed survey of the selected site</td><td rowspan="3">Field observation and interaction with User Committee</td></tr>
<tr><td>10:30-11:00</td><td></td><td>Tea Break</td></tr>
<tr><td>11:00-12:00</td><td>Registration</td><td>Formation and mobilization of User Committee</td></tr>
<tr><td>12:00-13:00</td><td colspan="3">Lunch</td></tr>
<tr><td>13:00-14:00</td><td>• Opening
• Introduction and Course Information</td><td>Site preparation and carryout plantation</td><td rowspan="2">Field observation and interaction with User Committee</td></tr>
<tr><td>14:00-15:00</td><td>Overview of local roads in Nepal and legal aspect on utilizing RoW</td><td>Plant maintenance, composting and harvesting</td></tr>
<tr><td>15:00-15:30</td><td colspan="3">Tea Break</td></tr>
<tr><td>15:30-17:00</td><td>Site and plant selection</td><td>Harvesting, value addition marketing</td><td>• Reflection of the field visit,
• Identify key action point
• Prepare action plan
• Debriefing and closing</td></tr>
</table>

SESSION PLANS

Session 1

Skill/topic: Introduction and course information				
Terminal Performance Objective: • Get acquainted with participants • Provide general information about the training **Enabling Objectives:** • Announce formal opening of training • Develop rapport between participants				
What (activities, key points, questions)	**Method**	**Media**	**Who**	**How long**
• Perform registration of participants	Individual work	Registration format	Participants	10 min
Announce the formal opening of the training	Formal opening session			20 min
Greet the class • Participants are divided into Group of two (it is envisaged 12 groups) • Each participant will have informal chat with the partner and will introduce his/partner to the whole group/class.	Icebreaking	Meta Cards	Participants	45 min
			Total	**60 min**

Session 2

Skill/topic: Overview of local roads in Nepal and legal aspects on utilisation of Right of Way (RoW).

Terminal Performance Objective:

- Describe constitutional provision related to road/infrastructure
- Explain the technical aspects/ road geometric design standards of local roads
- Explain legal aspects on utilisation of right of Way

Enabling Objectives:

- Discuss the constitutional provision (roles, responsibilities and rights) of 3 levels of Government in Nepal
- Describe constitutional provision related to road/infrastructure
- Focus the provision made in policies, acts, rules and regulation for roads in Nepal
  (Definition of infrastructure/road, road classification, status of roads etc in Nepal)
- Explain the road geometric design standards of local road. (Technical aspects)
- Discuss on purpose and use of ROW of local roads from the prospective of road safety and income generation.
- Explain the legal aspects of utilisation of RoW

What (activities, key points, questions)	Method	Media	Who	How long
Introduction				
• Greet the class • Show the map of Nepal and ask participants to tell one major changes after the restructuring of Nepal • Observe the participants reaction and tell that the constitute provisioned 3 levels of government	Oral question	PPT presentation	Trainer	5 min
Main body				
• Discuss on the constitutional provision of 3 levels of Government, their roles, responsibilities and rights	Oral questioning	Presentation slides	Trainer and participant	5 min
• Describe the constitutional provision related to infrastructure/road. • Focus or highlight on constitutional provisions made in policies, acts, rules and regulations such as definition, road classification, and road status in Nepal etc. • Display the province wise road status.	Visualized lecture	Presentation slides/Copy of policies, acts, rules and regulations.	Trainer	5 min

• Form 5 groups with 5 members in each group and ask them to list out the road geometric design standards and present them with brief explanation. (Carriageway, road width, Right of way, Design speed, gradient, extra widening, camber, traffic signs, road safety etc.)	Group work	Flip chart/ road drawings	Participant	Group work 10 min Presentation 3 * 5 min = 15 min **Total 25 min**
• Discuss on purpose and use of Right of Way (RoW) of local roads from the prospective of income generation and road safety • Explain the legal aspects of utilisation of Right of Way (ROW)	Discussion	Presentation slides/	Trainer and participants	15 min
Conclusion				
• Ask participants if they have any queries • Clarify the participants queries and wrap up the class	Question answer	-	Participants and trainer	5 min
			Total	**60 min**

Session 3

Skill/topic: Site and plant selection

Terminal Performance Objective:

- Coordinate with concerned stakeholders
- Develop site selection criteria
- Develop plant selection criteria

Enabling Objectives:

- List the stakeholders
- Coordinate with concerned stakeholders
- Develop criteria for selecting road section for plantation
  (road safety, bioengineering, income generation etc)
- Assess the site condition for productive use of the selected road section
- (Altitude, climate, temperature, rainfall, orientation of site slope, types of soil, fertility, moisture content etc.)
- List the name of possible plants that can be planted in the RoW land
- Develop plant selection criteria
- Select suitable plants for the plantation

What (activities, key points, questions)	Method	Media	Who	How long
Introduction				
Greet the class Link the previous session and focus on use of RoW land for income generation Give an overview of the session	Review Visualized lecture	PPT presentation	Trainer	5 min
Main body				
• Ask participants to tell the possible stakeholders for plantation of RoW land. (List the stakeholders in meta card. One stakeholder in one card) • Explain briefly the importance of listed stakeholders. • Highlight their roles in site selection. • Explain coordination with concerned stakeholders for site selection and plantation.	visualized lecture	Meta card/PPT presentation	Trainer	20 min

• Discuss on technical criteria, bioengineering criteria, productive use of land criteria of road section. • Explain the site condition for productive use of the selected road section. (climate, altitude, orientation of site slope, types of soil and soil fertility, moisture content, temperature, rainfall etc)	Discussion / Visualized lecture	PPT presentation	Trainer	10 min
• Form 5 groups with 5 members in each group and provide assignment to Develop site selection criteria in flip chart. • Every group will present site selection criteria to the whole class	Group work	Participants	Flip chart	20 min
• Form 5 groups with 5 members in each group and ask them to o List down the possible plant that can contribute to income generation. o Develop plant selection criteria and o Select the suitable plant • Participants will write one name of a plant in one meta card and present the suitable plants to whole class • Trainer will provide feedback	Group discussion	Meta card	Participants	Group work 20 min Presentation 2 *5 = 10 min **Total 30 min**
Conclusion				
• Show the photographs of plants missed by the participants conclude the session by showing the suitable plants for ROW plantation.	Brainstorming	Presentation slides/meta card	Trainer and participants	5 min
			Total	**90 min**

Session 4

Skill/topic: Detail survey of the selected site				
Terminal Performance Objective: • Conduct detail survey of the selected site • Perform cost benefit analysis **Enabling Objectives:** • Give an overview of bio-engineering concept, principles and factors affecting the selection of site • Explain the desk study of selected road site • Describe the consideration of road safety when work in slope • Discuss the preparatory works and the site activities • Explain the selection of species • Determine the need of civil structures • Prepare plantation plan • Calculate cost estimate for plantation • Demonstrate cost benefit analysis				
What (activities, key points, questions)	**Method**	**Media**	**Who**	**How long**
Introduction				
• Greet the class • In the previous session we selected the road section and suitable plants for the plantation • Now what other components or elements should be considered before we carryout Plantation? • Observe the participants reaction and tell that the detail survey of the selected site should be conducted.	Review/oral question		Trainer	5 min
Main body				
• Show the contents of detail survey of the selected site • Give an overview of bio engineering concepts, principles and factors affecting the selection of site • Explain briefly the desk study of selected site (explain the technical parameters such as road width, right of way, surface status etc)	visualized lecture	Presentation slide	Trainer and participant	10 min

• Describe about the risks and safety that should be considered when work in slope				
• Discuss on preparatory works and the site activities • Explain the selection of species • Determine the need of civil structures	Visualized lecture	PPT presentation	Trainer	10 min
• Explain the unit cost and cost calculation of the plants. • Demonstrate the cost benefit analysis. • Form 5 groups with 5 members in each group and ask them to prepare plantation plan. They need to calculate the no of plants their total cost and cost benefit analysis. • The group will present their plan to the whole class and feedback will be provided	Group Assignment	Flipchart	Participants	10 min Group work 20 min
Conclusion				
Wrap up the session with reviewing the key points	Review		Trainer	5 min
			Total	**60 min**

Session 5

Skill/topic: Formation and mobilization of User's committee				
Terminal Performance Objective: • Form and mobilize User's committee for plantation **Enabling Objectives:** • Describe the formation and mobilization of User's committee in different stages • Explain the activities needed to be carried out during Program planning and preparation • Explain the activities needed to be carried out during Project implementation • Explain the activities needed to be carried out during Program monitoring and evaluation				
What (activities, key points, questions)	**Method**	**Media**	**Who**	**How long**
Introduction				
• Greet the class • Ask question • In the previous session we performed the economic analysis now what is the next step? • Observe the participants reaction and tell them the User's committee which will perform the plantation in ROW land. • So we will discuss the formation and mobilisation of User's committee in this session	Oral question	Presentation slide	Trainer and participant	5 min
Main body				
• Explain the User's committee and its importance. • Describe the formation and mobilization of UC in different stages namely: Program planning and preparation; Project implementation; Project monitoring and evaluation.	Visualized lecture	PPT presentation	Trainer	20 min
• Form 3 groups. Assign the group as follows: • 1st group will write activities needed to be carried out during program planning and preparation stage • 2nd group will write activities needed to be carried out during program implementation stage	Group Assignment	Flipchart	Participants	Group work 15 min Presentation 5 *3 = 15 min **Total 30 min**

• 3rd group will work on activities needed to be carried out during program monitoring and evaluation • The group will present their findings to the whole class and the trainer will provide feedback. Focus on following: <u>Planning and preparation stage</u> ▪ Interaction with concerned stakeholders (Province and Local level) ▪ Municipality to select LRN for implementation ▪ Ranking of roads for RoW planning ▪ Committee formation for implementation <u>Implementation stage</u> • Training needs assessment • Capacity building activities • List of training programs <u>Program monitoring and evaluation stage</u> ▪ Monitoring mechanism, ▪ Regular monitoring and supervision ▪ Joint monitoring activities ▪ Process documentation ▪ Benefit sharing mechanism ▪ Programme evaluation ▪ Replication the learning and experiences in other areas				
Conclusion				
• Ask class why User's committee is important in this program. • Explain the importance if necessary.	Oral question		Trainer	5 min
			Total	**60 min**

Session 6

Skill/topic: Site preparation and carryout plantation				
Terminal Performance Objective: • Prepare site for plantation • Perform the plantation activities **Enabling Objectives:** • Prepare Work plan • Ensure civil structures are in place • Prepare fencing if required • Manage irrigation provision • Carryout plantation activities				
What (activities, key points, questions)	**Method**	**Media**	**Who**	**How long**
Introduction				
▪ Greet the class				
▪ We have already learned how to select the road section for plantation. Now can we start plantation. ▪ The answer will be no ▪ Then what do we need to do? ▪ We need to prepare plantation plan so today we will discuss on what needs to be considered during preparation of plantation work plan.	Oral question	Presentation slide Flip chart	Trainer and participant	5 min
Main body				
▪ When we say plantation work plan, what comes into your mind? Observe the reaction and focus on work activities, human resource plan, fund management, tools and equipment management etc. ▪ Explain the physical interventions that need to be completed prior starting the plantation process such as: ensuring minimum civil engineering structures in place, preparation of fencing if required, provision of irrigation etc.	Visualized lecture	Presentation slides/Performance guide/ plantation steps	Trainer	50 min

▪ Likewise explain the requirement of site preparation work such as: Layout of pit, digging holes, collection of species and plants, etc. ▪ Provide input on carrying out plantation procedures ▪ Emphasize on critical steps and safety points ▪ Familiarize with hand tools required				
Conclusion				
• Emphasize the critical and safety steps in plantation procedure	Discussion	Flipchart	Trainer and participants	5 min
			Total	**60 min**

Session 7

Skill/topic: Plant maintenance, composting and harvesting				
Terminal Performance Objective: • Explain plant maintenance activities (watering, mulching, weeding, protection from animals etc) • Determine harvesting time **Enabling Objectives:** • Define weeding, mulching, composting and fencing • Explain the requirement of plant maintenance (watering, mulching weeding and protection from animals etc.) • Explain harvesting				
What (activities, key points, questions)	**Method**	**Media**	**Who**	**How long**
Introduction				
Greet the class				
• Ask what activities needs to be carried out after plantation • The participants may say monitoring • Ask why do we need monitoring? And how do we monitor plants? • Relate the answer with the session and say today we will learn about plant care and maintenance.	Visualized lecture	Presentation slide	Trainer	5 min
Main body				
• Provide input on carrying out plant care. • Define weeding, mulching, composting fencing etc. • Explain the requirement of plant maintenance • Demonstrate how to perform weeding, mulching, composting, fencing. • Explain when these activities are carried out. • Emphasize on critical steps and safety points • Familiarize with hand tools required	Visualized lecture	Presentation slides/ Plant care steps	Trainer	35 min
• Define harvesting and determine the harvesting time		Real objects/ performance guide	Trainer and participants	15 min

Conclusion				
• Debrief about the necessity of plant care and maintenance process. Highlight on harvesting time	Visualized lecture	PPT presentation	Trainer	5 min
			Total	**60 Min**

Session 8

Skill/topic: Harvesting, value addition marketing				
Terminal Performance Objective: • Explain value chain development **Enabling Objectives:** • Define value addition • Explain value chain development • Explain market and marketing • List enabling environment for marketing				
What (activities, key points, questions)	**Method**	**Media**	**Who**	**How long**
Introduction				
Greet the class				
Ask participants • What do you understand by value addition?	Experience sharing Oral questioning	Flip chart/ presentation slides	Participants /trainer	5 min
Main body				
▪ Define value addition ▪ Explain the value chain development ▪ Describe the market and its importance in income generation activities. ▪ Explain the market survey, mutual cooperation between market actors, marketing skill of members of UC etc ▪ List enabling environment for marketing	Visualized lecture	Presentation slides/	Trainer	30 min
Group work • For the groups formed in the previous sessions provide assignment to develop the business plan with cost benefit analysis. • Trainer will provide inputs as and when required • Focus that the product needs to sell on the determined selling price for their benefit.	Group assignment/Group work	Flip chart	Trainer and participants	20 min

Conclusion				
• Debrief on the value addition and value chain development; business plan development and marketing of commodity	Debriefing	Flipchart	Trainer	5 min
			Total	**60 min**

Session 9, 10 and 11

Skill/topic: Field observation and interaction with User's committee				
Terminal Performance Objective: • Walkover survey along the selected road section to identify the locations of plantation or observe how the plantation in ROW is being carried out. • Interact with Users committee members				
What (activities, key points, questions)	**Method**	**Media**	**Who**	**How long**
Field visit				
Participants will be provided an assignment where the participants need to observe followings very carefully and share their findings to the group. 1. Identification of road section for ROW plantation 2. List of plants planted in the ROW land 3. Lay out of plantation 4. Maintenance of plants 5. Market for selling the product 6. Interact with UC.	Study field visit	Assignment sheet	Participants /trainer	3 hrs
			Total	**4 hrs**

Session 12

Skill/topic: Identify key action point and prepare action plan
Terminal Performance Objective: • Identify key action points • Prepare action plan

What (activities, key points, questions)	Method	Media	Who	How long
▪ The participants will share their field visit observations	Experience sharing			30 min
▪ Participants will be provided an individual assignment to identify the key action point and prepare action plan	Individual assignment	Assignment sheet	Participants	30 min
▪ Conduct debriefing by 3 F method (Fact, Feeling and Future) ▪ The participant will evaluate the training program and provide constructive feedback for improvement	Group and individual work	Training evaluation format/Flipchart	Trainer and participants	15 min
▪ Closing				15 min
			Total	**90 min**

EVALUATION SYSTEM

a) Participant evaluation

No formal evaluation of the participants will be carried out. However following criteria will be considered to assess the attitude of the participants.

- Professionalism
- Attendance
- Punctuality
- Communication skills
- Contribution to the overall training effort
- Group participation
- Leadership exhibited
- Perceived effort
- Preparation for class

b) Course evaluation

At the end of the training the debriefing session will be conducted, where the participants will reflect back the training sessions and provide constructive feedback for improvement.

Figure 4: Effect of Road Widening on RoW Plantation