Environmental Monitoring Report

Environmental Monitoring Report
Project Number: 30232
May 2010

NEP: Decentralized Rural Infrastructure and Livelihoods Project

Prepared by Project Coordination Unit, DRILP, Kathmandu for the Asian Development Bank (ADB).

Government of Nepal
Ministry of Local Development
Department of Local Infrastructure and Rural Roads
Decentralized Rural Infrastructue and Livelihood Project
Loan No. 2092-NEP (SF)

Environmental Monitoring Report
For
DRILP

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Abbreviation

ADB Asian Development Bank

BG Building Group

CF Community Forest

CFUG Community Forest Users Group

CISC Central Implementation Support Consultant

DDC District Development Committee

DFO District Forest Officer

DISC District Implementation Support Consultant

DPO District Project Office

DRILP Decentralized Rural Infrastructure and Livelihood Project

DTO District Technical Office

EMP Environmental Management Plan

EPA Environmental Protection Act

EPR Environmental Protection Rule

GoN Government of Nepal

IEE Initial Environmental Examination

LEP Labour based, environment friendly and participatory

LHFG Leasehold Forest Group

NTFP Non Timber Forest Products

SDC Swiss Agency for Development and Cooperation

1. Background

1. The Decentralized Rural Infrastructure and Livelihood Project (DRILP) is being implemented with Loan 2092-NEP (SF) from Asian Development Bank (ADB), grant from Swiss Agency for Development and Cooperation (SDC), counterpart funding from Government of Nepal (GoN), participating districts and contributions from project beneficiaries. The project goal is to reduce rural poverty in 18 very poor remote hill and mountain districts (Darchula, Baitadi, Bajura, Bajhang, Jajarkot, Dolpa, Jumla, Kalikot, Mugu, Humla, Baglung, Myagdi, Gorkha, Lamjung, Ramechhap, Okhaldhunga, Solukhumbu, Taplejung) affected by the conflict. The purpose is to achieve sustainable increased access to economic and social services, and enhanced social and financial capital for people in the project area, particularly poor and disadvantaged groups. The Project through specific rural transport subprojects will also extend the network of improved rural transport infrastructure, consisting of roads, trails and pedestrian bridges.

2. The main strategy of DRILP to address the potential environmental impacts is by adopting labour basedenvironment friendly and participatory (LEP) approach in planning and implementing construction works. Environmental assessment is the primary administrative tool to integrate environmental considerations into decision-making to ensure that proposed development intervention will have minimal environmental impacts. Therefore, environmental assessment for the sub-projects under DRILP is imperative in order to assess the environmental consequences of the rural road rehabilitation and construction activities and suggest appropriate, practical and site specific mitigation and enhancement measures. In this context, Initial Environmental Examination (IEE) reports have been prepared for the district road sub-projects in accordance with the environmental regulations (Environmental Protection Act, 1997 and Environmental Protection Rule, 1997) of GoN and also satisfying the ADB environmental procedures. These IEE reports of the road sub-projects have been approved by the MLD and concurrence is given by the ADB (refer **Annex 1** for IEE status and **Figure 1** for the location of the sub-projects in the districts).

3. During the construction and rehabilitation of the road sub-projects, environmental monitoring is an important tool to ensure the compliance of mitigation measures and implementation of environmental management plan (EMP). This environmental monitoring report is being compiled and prepared for the whole DRILP based on the quarterly environmental reports received from the districts (Darchula, Baitadi, Bajura, Bajhang, Jumla, Humla, Baglung, Myagdi, Lamjung, Ramechhap, Okhaldhunga, Solukhumbu,) and field visit reports by the CISC Environmental Team.

2. Objectives

4. The main objectives of environmental monitoring are:
   - To review and monitor whether the recommendations of IEE are being implemented according to environmental management plan (EMP)
   - To assess and monitor the performance of the environmental protection measures recommended for minimizing or controlling likely negative impacts occurred during construction period.

3. Monitoring methods

5. Following methods have been used for environmental monitoring:
   1. Field observation and inspection
   2. Interview/meeting with workers and other stakeholders
   3. Counting/measurement
   4. Record inspection

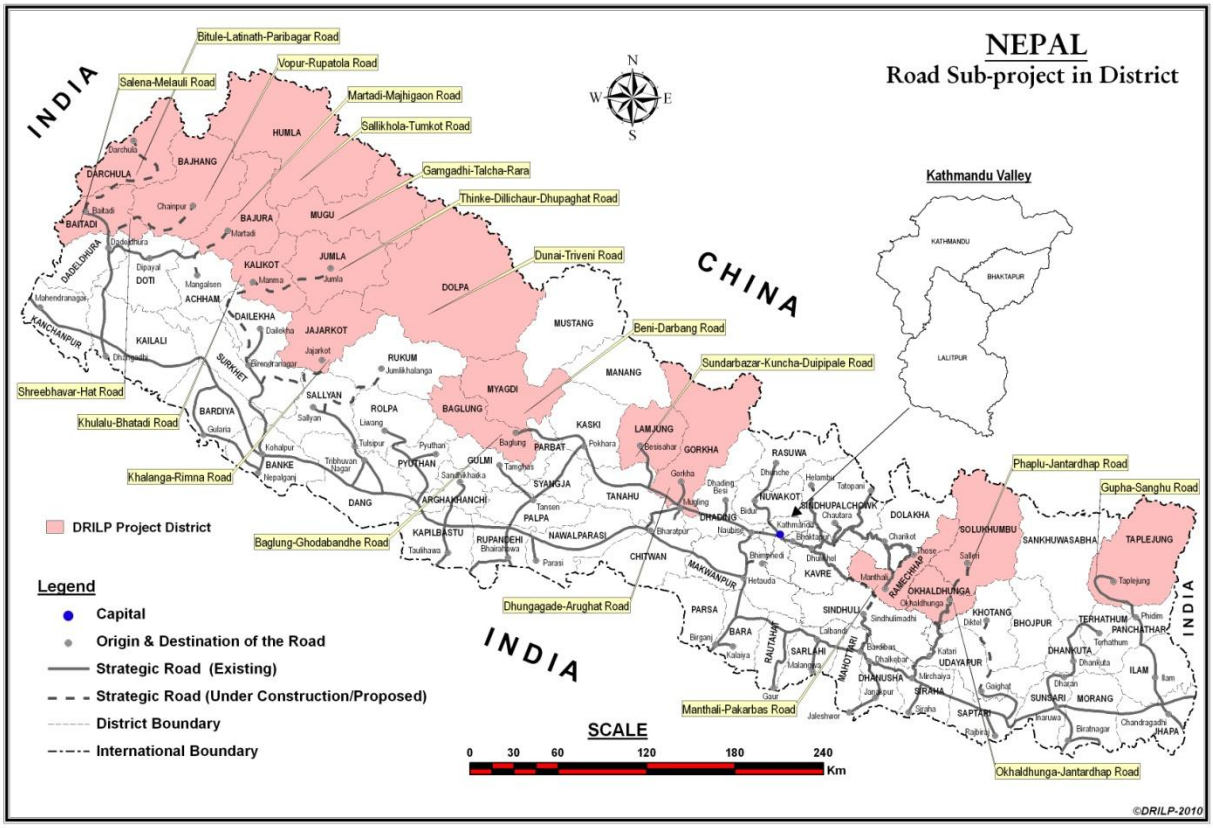

Figure 1. Map of Nepal showing the sub-projects in districts within DRILP

4. Construction Approach

6. The road sub-projects under DRILP have been constructed using the labour-based, environment-friendly and participatory (LEP) approach. However, for rehabilitation and upgrading to gravel standard in some roads like Baglung-Ghodabadhe road in Baglung district, trucks and tractors are also used for the transportation of the construction materials and rollers are used for compaction purpose. The important features of LEP approach are:

- Use of local people as labour, hand tools and small equipment, rather than heavy machinery for construction.
- Balancing cut and fill and reuse of excavated materials as construction materials and thus not generating excess spoils as far as possible.
- Use of bio-engineering techniques: integrated use of vegetation, simple civil engineering structures and proper water management systems for slope protection.

5. Limitations

7. The District Project Coordinator as a proponent of IEE is responsible for carrying out process checks and supervision for environmental monitoring and reporting on quarterly basis. However, environmental monitoring report has not been received from Kalikot, Mugu, Dolpa, Taplejung, Gorkha and Jajarkot districts. Therefore, environmental issues of road sub-projects within these districts could not be reflected in this environmental monitoring report.

6. Environmental monitoring Training

8. IEE orientation and environmental monitoring trainings have been conducted for DDC, DTO, DPO, DISC team members at central level as well as in district level to support these organizations for carrying out environmental assessment and environmental monitoring effectively (refer **Table 1)**. They are also provided with environmental monitoring format for quarterly reporting as given in **Annex II**.

Table 1. Details of Trainings Conducted

Type of training	Date	Venue	Participants
IEE orientation training	10-12 Nov. 2006	Solukhumbu	DDC, DTO, DPO, DISC team members
IEE orientation training	29-30 May 2007	Baglung, Mygdi	DDC, DTO, DPO, DISC team members
IEE Orientation training	20-21 Sept. 2007	Kathmandu	DTO Engineer, DPO Engineer, DISC (Team Leader and Social Mobilization Coordinator) of 18 districts
Environmental monitoring training	17 Dec. 2007	Okhaldhunga	DTO, DPO, DISC team members
IEE orientation training	29 Feb. 2008	Lamjung	DISC team members
IEE orientation training	13 June 2008	Baitadi	DPO and DISC team members
Environmental monitoring training	12 Nov. 2008	Bajhang	DPO and DISC team members
Environmental monitoring training	4-5 August 2009	Kathmandu	DPO Engineer, DISC (Team Leader and Social Mobilization Coordinator) of 18 districts
Environmental monitoring training	9 Dec. 2009	Ramechhap	DPO and DISC team members
Environmental monitoring training	10 Jan. 2010	Bajura	DPO and DISC team members
Environmental monitoring training	3 Feb. 2010	Jumla	DPO and DISC team members

7. Monitoring activities

9. Following parameters are considered during environmental monitoring of the sub-projects:
   - Employment Generation and Technical Skill
   - Trade and Market Center Development
   - Land Value Increase
   - Landslides or other forms of Slope Instability
   - Disposal of Spoils and Construction Wastes
   - Water Management and Water Quality
   - Air Quality and Noise Pollution
   - Disruption of Community Infrastructures
   - Quarrying of Construction Materials
   - Loss or Degradation of Forest Vegetation
   - Wildlife and Bird Habitat
   - Loss or degradation or threat to private properties (agricultural lands, assets)

- Disruption of Community Infrastructures
- Health, Occupational Safety and Camp Site Management
- Sites for Cultural and Religious Values
- Change in Migration Pattern

8. Environmental Impacts and Benefit Augmentation and Mitigation Measures

10. There are both beneficial as well as adverse impacts from the construction and rehabilitation of road sub-projects within the DRILP districts. An effective implementation of benefit maximization measures and adverse impacts mitigation measures would optimize the benefits and avoid/minimize the adverse impact from the sub-project. Following is the summary of the beneficial and adverse impacts along with benefit augmentation and mitigation measures in road sub-projects within DRILP:

8.1 Beneficial Impacts and Benefit Augmentation Measures

8.1.1 Employment Generation and Technical Skill

11. One of the major direct beneficial impacts of the road during construction stage is the creation of employment opportunity to the local community as a building group (BG) member and workers. The participation of women in the BGs is encouraging with more than 38% involvement which is near to 40% (minimum threshold). The amount of money earned by the wages is directly enhancing various economic activities and enterprise development along the road corridors. The wage earned by the local people ranges from NRs four to eight thousands per month. Even some of the households are earning up to one hundred thousand (100,000) NRs per season by working with 3-5 members from each household. Money earned is mainly spent for the paying back of loan followed by buying ornaments (especially by women), land, cattle and goats apart from spending on food and education of children. To utilize their money earned from the project works, DRILP has conducted following three types of training: (i) awareness raising training, (ii) life skill and income generation training and (iii) technical skill training. List of trainings and number of participants is given in **Annex II.**

8.1.2 Trade and Market Center Development

12. During construction period, different types of commercial activities have been in operation in order to meet the demand of workers along the road alignments. A number of small shops mainly grocery and tea stalls around the vicinity of the construction sites have been opened. New market centers are emerging and existing markets are expanding along the road alignment like in Chitre and Jantardhap in Okhaldhunga district, Salme, Ramite, Pekarnas in Solukhumbu district, Yalbang in Humla district, Khamhale, Salena and Kotila in Baitadai district, Vopur and Sunikot in Bajhang district, Sundar bazaar of Lamjung district, Achhate and Pokharatok in Baglung district, Singha, and Babiyachaur in Myagdi, district, Thati in Ramechhap district, Urthu Chautara and Dillichaur in Jumla district **(**see **Annex V).**

13. New shops and buildings are being constructed and this process is gaining momentum along most of the road corridors. Number of new shops ranges from 4 to 81. Besides this, volume of business and local trade has increased considerably in the market centers. In some of the road corridors, small cottage industries like lokta paper making, iron grill making (fabrication) have already been established.

8.1.3 Land Value Increase

14. Land value has increased substantially along the road corridor. In some districts, land price have been increased up to ten times especially along the market centers as mentioned above.

8.2 Adverse Impacts and Mitigation Measures

8.2.1 Landslide and other forms of Slope Instability

15. Construction approach was found to be supportive to minimize land slide and erosion. Usually road construction works have been stopped during rainy season to minimize landslide and soil erosion. There are minor landslides along the road sub-projects which are primarily passive in nature except Salme landslide along Phaphlu-Jantardhap road which has been now completely rehabilitated. Retaining walls have been constructed to maintain slopes. Gabion structures seem stable for the protection of slopes.

16. Bioengineering measures are adopted in some of the road alignments like Phaphlu-Jantardhap and Okhaldhunga-Jantardhap road sub-projects at various chainages **(**see **Annex V)**. In other road sub-projects, survey and estimate has been completed for bioengineering activities (Darchula, Baglung, Baitadi, Myagdi, Bajhang, Ramechhap districts). However, in some other districts, survey and estimate for bioengineering activities has not started yet. It is reported that minimum damage to vegetation has been ensured and minimal numbers of trees have been cut to protect the slopes. Nursery establishment has not been done.

8.2.2 Disposal of Spoils and Construction Wastes

17. Compensations for damaged crops have been provided to the land owner where spoil has fallen in their farmland (Okhaldhunga, Darchula, Bajhang, Baitadi districts). Cut and fill balance has been maintained as far as possible. Excavated materials were either reused or managed by constructing toe walls. Excess spoils have been disposed in specified tipping sites in a controlled manner. It is observed that in some road sub-project, spoil has been haphazardly disposed due to the lack of toe walls and unavailability of gabions.

18. Retaining walls have been constructed to protect from slope failure. Spoils and debris disposals have been avoided on fragile slopes, farmland, marshy land, forest areas, natural drainage path, canals and other infrastructures. Stock piling of top soil has been done for the further use along the road alignment in Okhaldhunga and Ramechhap districts. Coordination is done with concerned CFUGs for the safe disposal of spoil in the community forest area (Okhaldhunga district).

8.2.3 Water management and water quality

19. There is no disturbance in natural water courses and water discharge into farm and risky area is being avoided. Spoil disposal is also avoided in water bodies. So far, quality of the water near to roads has been observed good. However, water sources get contaminated due to erosion during the rainy season. Necessary dry stone and concrete causeways and RCC cross drainage have been constructed along the streams. In some perennial streams with long span, bridges have been proposed.

8.2.4 Air Quality and Noise Pollution

20. There is no significant adverse effect on air quality and noise during the road construction. As the most of the roads are earthen, workers have been provided with face masks to protect themselves from dust generation. In addition, ear muffles were provided where necessary especially during rock breaking and quarrying. Since the roads are being constructed with LEP approach, there are no significant impact observed due to pollution from dust generation, grease and fuel spills as heavy machines are not used except in Baglung-Ghodabadhe road where trucks are being used for transportation of gravelling materials and rollers are used for compaction. In this road, spraying of water is done near the settlement and schools during the construction to reduce air pollution due to dust generation.

8.2.5 Quarrying of Construction Materials

21. There is a limited requirements of quarries and borrow pits as most of the roads are in mountain regions where stones are available along the road. However, in some sub-projects like, Baglung-

Ghodabadhe road river bed material required for gravelling. Unstable sites, erosion prone area, dense forest area, settlements, fertile farm land were avoided for quarrying operation. After the extraction is completed, the quarry site and river banks in some of the roads have already been rehabilitated and in other roads are under rehabilitation process.

8.2.6 Loss or degradation of Forest Vegetation

22. Tree felling is avoided as far as possible along the road alignment. Tree cutting is limited to the five meter formation width and only required numbers of trees are removed from the road alignment. Compensatory plantation has to be done to compensate the loss of trees from the forest area. So far, no compensatory plantation has been reported from the districts. However, in some districts (Ramechhap, Jumla, Bajhang) coordination has been initiated with District Forest Office (DFO), Community Forest Users Group (CFUG), Leasehold Forest Groups (LHFG) for the compensatory plantation and production of seedlings.

23. There is no high pressure on adjoining forest for fuel wood and timber. Nevertheless, it has been reported that trees are being cut for heating rocks (big boulders) for breaking them along the Sallikhola-Tumkot road sub-project in Humla district (refer **Annex V case study 5**). It is due to unavailability of hydraulic rock splitter and portable drilling machine and other necessary equipments for rock breaking as well as lack of awareness for forest conservation.

8.2.7 Wildlife and Bird Habitat

24. Most of the road corridors are not significant habitat for wildlife and bird species. No cases of wildlife hunting and trading of wild life products by the workers have been reported. Awareness programs for workers have been done before the construction of road in the forest area to minimize effect on disturbance to wildlife and illegal hunting.

8.2.8 Loss or degradation or threat to private properties (agricultural lands, assets)

25. Dismantling of private structures is avoided as far as possible by shifting the alignment or providing protection structures like retaining walls. Compensations for the private properties (land, tree, structures and other assets) have been provided to the owners according to the Resettlement Plan (RP). Land acquisition, private property loss and compensation issues are being monitored and documented in the Verification Report prepared by the Resettlement Component of the project.

8.2.9 Disruption of Community Infrastructures

26. Community infrastructures such as irrigation canal, drinking water supply pipe and tap, water reservoir, intake, trail, resting places (chautari) have been rehabilitated and restored in Myagdi Okhaldhunga, Baglung, Bajhang, Lamjung, Solukhumbu districts **(**see **Annex V**). In some districts like Darchula, Ramechhap, Humla, Jumla estimate has been done for the rehabilitation of these community infrastructures and work will start soon.

27. Irrigation canal was disrupted at Ch 0+800 along Vopur-Rupatola road in Bajhang district during the road construction coinciding with farming season. So, five water pumps were used to lift water for irrigation purpose from Seti River as an alternative for irrigation canal. Likewise in Baglung-Ghodabadhe road, 1.350 km drinking water supply pipeline has been shifted from the road alignment to maintain the continuous supply of water for Baglung Municiplity as the existing pipe line has been disturbed during road construction.

8.2.10 Health, Occupational Safety and Camp site management

28. The workers have been provided with helmets, goggles, face masks, ear muffles and gloves depending on the nature of the construction work **(**see **Annex V**). However, these safety gears are not provided in adequate number for all the workers. Workers have been provided with first aid and health

facilities. Group accidental insurance has been done for all the members in BGs to cover medical expenses, permanent damage and fatal cases due to accidents. In some contractor's package, it is reported that workers have not been covered by insurance (Bajura district).

29. Most of the accidents occurred during road construction (Baitadi, Humla, Darchula, Baitadi) are minor in nature except a death casualty in Okhaldhunga district. Victims have been provided with medical expenses and compensation from the insurance. In some cases it has taken long time to get the compensation. Therefore, in some districts like Baitadi, emergency fund is being used to pay the medical expenses for the workers.

30. There are few camps established by the contractors for outside workers. These camps are temporary in nature and constructed by using bamboo, wood, stone, CGI sheet, thick plastic sheets etc. Drinking water facility has been provided to the workers and temporary pit latrines have been established in few campsites.

8.2.11 Sites for Cultural and Religious Values

31. Mainly temples and manes (Buddhist temple) have been affected due to road construction as they fall in the road alignment. Pathapale temple in Bajhang and Thati temple in Ramechhap have been shifted in consultation with local people. Likewise, Setomane (Buddhist temple) in Solukhumbu has been rehabilitated and two mane in Okhaldhunga have been relocated in consultation with local people

8.2.13 Change in Migration pattern

32. Employment generation for the local people has a positive impact as it contributes significantly to minimize seasonal migration to other parts of the country as well as in foreign countries especially in India. From Baitadi, Bajura, Bajhang districts, people have stopped migrating to India due the availability of work at their door steps. This has not only contributed in the improvement of their livelihood, but also provided them other source of income by working in their farms along with their family members. This has also positive implications for the better health as there is less risks for transmitting HIV/AIDS and sexually transmitted diseases. It is reported that reduction in seasonal migration is 70% in Solukhumbu and Okhaldhiunga. Similarly, 80% people from the road corridor of Sallikhola-Tumkot road sub-project in Humla district has stopped migrating seasonally to Taglakot in Tibet Autonomous Region of China. In Baitadi, Bajhang and Bajura district, majority of the people residing along the road corridors has stopped going to India in search of employment opportunities. Even some people are returning from India to work in the road sub-projects (refer **Annex IV case study**).

9. Issues

33. Following issues should be addressed on timely manner:

- Health and safety of workers is not given priority. Though basic safety gears are provided to workers, these are not in adequate number. Even workers have not been covered by accidental insurance in some of the contractor's package.
- Bioengineering applications are still to be done in most of the road sub-projects.
- Compensatory plantation has not been done in any district. For this, proper coordination between DFO/ CFUG/LHFG and project is imperative.
- Quarterly reporting is not regular from the districts in spite of environmental monitoring training, availability of monitoring format as well as frequent requests from the CISC. Even some districts (Kalikot, Mugu, Dolpa, Taplejung, Gorkha and Jajarkot) have not sent a single environmental monitoring report.

- Lack of timely procurement of necessary equipments like, hydraulic rock splitter and portable drilling machine has adverse impact as trees are being used for breaking boulders. Consequently there will be depletion of the forest vegetation along the road alignment.

10. Recommendation

34. Based on the monitoring reports from the districts and field visit reports, following recommendations are made:

- Basic health facilities and occupational safety gears should be provided in adequate number to all workers. Moreover, workers of both BGs and contractors' package should be insured.
- Planning for the procurement of seeds and seedlings should be immediately commenced so that bioengineering activities could be started before the rainy season.
- Coordination between the proponent (DDC) and DFO/CFUG/LHFG should be initiated to carry out compensatory plantation.
- Necessary equipments (hydraulic rock splitter and portable drilling machines) should be provided to the workers to avoid use of trees for breaking boulders by heating.
- District Project Managers should provide quarterly environmental reports in time and on regular basis.

Annexes

Annex I Status of Environmental Assessment in the Districts

District	Sub-project	Present Status	Length (Km)		Employment Generation (Person days)		Remarks
			Rehab	New	unskilled	skilled	
1. Taplejung	a) Gupha-Sanghu	IEE approved by MLD and concurrence given by ADB		20.6	326,438	25,667	
	b) Sanghu-Dobhan	IEE submitted to ADB and MLD		21.8			
2. Solukhumbu	a) Salme-Jantardhap	IEE approved by MLD and concurrence given by ADB	21.7		232,854	7673	
	b) Phaplu-Salme	REA Checklist approved by ADB	15.4				
	c) Garma-Nele-Budhidanda	IEE report under preparation		27			
3.Okhaldhunga	a) Okhaldhunga-Jantardhap	REA Checklist approved by ADB	21.5				
	b) Rumjatar-Khartekhola	IEE report sent to DDC for review		16.5			
4. Ramechhap	a) Manthali-Pakarbas	IEE approved by MLD and concurrence given by ADB	16.8		161,757	2,648	
	b) Manthali-Kathajor-Dhobi	IEE approved by MLD and concurrence given by ADB	14	8.3	252,048	19,664	
5. Gorkha	Dhungagade-Arughat	IEE approved by MLD and concurrence given by ADB	37		247,086	6,956	
6. Lamjung	a) Sundarbazaar-Kunchha-Duipipale	IEE approved by MLD and concurrence given by ADB	23.6		232,854	7,673	
	b) Salmebhanjyang-Ghamrang	IEE submitted to ADB and MLD		7.5			
7. Baglung	a) Baglung-Ghodabadhe	IEE approved by MLD and concurrence given by ADB	25.4		169,910	4,804	
	b) Baglung-Kushmisera	IEE submitted to ADB and MLD	21.5		228,227	13,965	
8. Myagdi	a) Beni-Darbang	IEE approved by MLD and concurrence given	23.1		149,945	23,367	

		by ADB					
	b) Beni-Pakhapani	IEE report approved	10	9			IEE prepared by RRRSDP
9. Jajarkot	a) Khalanga-Rimna	IEE approved by MLD and concurrence given by ADB		16.5	340264	16959	
	b) Dhungila-Rokayagaon	ToR for IEE approved and IEE under preparation		48			
10. Jumla	a) Thinke-Dillichaur-Dhupaghat	IEE submitted to ADB and MLD	4.9	10.6			
	b) Kudari-Tamti-Topla	IEE under preparation		21.32			
11. Humla	Sallikhola – Tumkot	IEE approved by MLD and concurrence given by ADB		22.15	705,430	32,777	
12. Dolpa	a) Dunai-Triveni	IEE approved by MLD and concurrence given by ADB	8	6	184,370	7,374	
	b) Dunai-Lhasicape-Dho	IEE report under preparation		15			
13. Mugu	a) Gamgadhi-Talcha-Rara	IEE approved by MLD and concurrence given by ADB		14.5	155,517	7,775	
	b) Rara-Chimdhungri-Kalakandalek	IEE report under preparation		20			
14. Kalikot	a) Khulalu-Bhartadi	IEE approved by MLD and concurrence given by ADB		20.07	1,306,358	32,017	Rengil-Bhatadi section
	b) Bhartadi-Laifu	IEE report under preparation		7.1			
15. Bajura	a) Martadi-Majhigaon	IEE approved by MLD and concurrence given by ADB		7	208,452	5,514	
	b) Barbis-Atichaur	IEE report under preparation		22.7			
16. Bajhang	a) Vopur-Rupatola	IEE approved by MLD and concurrence given by ADB		17.9	444,367	13,592	
	b) Rupatola-Pativid-Dhuli	ToR for IEE under preparation		22			Walkover survey completed

17. Baitadi	a) Shreebhavar - Hat	IEE approved by MLD and concurrence given by ADB		24	502,732	21,741	2 sub-projects (Shreebhavar-Kotila 15 km and Kotila-Hat 7 km)
	b) Salena-Melauli	IEE approved by MLD and concurrence given by ADB		19.5	444,368	7,682	
18. Darchula	a) Bitule-Latinath-Paribagar	IEE approved by MLD and concurrence given by ADB		14.8	248,943	16,181	
	b) Khar-Khalanga	IEE report reviewed by CISC and sent to DDC		18			

Annex II Table for Environmental Monitoring Format

A. Beneficial Impacts

SN	Activity	Details	Remarks
1.0	**Employment generation and technical skill**		
1.1	Number of local labour employed in contractor package		
1.2	Number of women in work force with BG		
1.3	Number of child workers (if any)		
1.4	Number of life skill training conducted and participants number		
1.5	Number of technical training conducted and participants number		
2.0	**Trade and commerce**		
2.1	Number of shops increased or decreased		
2.2	Rental of houses and land spaces increased or decreased		
2.3	Volume of business increased/decreased		
2.4	Establishment of cottage industries in the vicinity of project area		
3.0	**Saving of time and travel cost**		
4.0	**Land value**		
5.0	**Cross drainage structure**		
B.	**Adverse impacts**		
	Landslides or other forms of slope instability		
6.1	Number and location of slope failure		
6.2	Disturbed area due to lack of drainage		
6.3	Presence of fresh gullies and erosion		
6.4	Measures for landslide and erosion control		
6.5	Application of bioengineering measures		
6.6	Establishment of nursery (no. and location)		
7.0	**Disposal of spoils and construction wastes**		
7.1	Cut and fill balance maintained or not		
7.2	Stockpiling of construction materials done properly or not		
7.3	Care and safe storage of top soil for later use		

7.4	Spoil falling or being washed on to forest and farm land		
7.5	Compensation provided to land owner and measures to prevent further damage		
7.6	Presence of toe walls for safe disposal of excavated materials and other construction wastes		
8.0	**Water management/water quality**		
8.1	Disruption of drinking or irrigation water supplies and their restoration and rehabilitation status		
8.2	Drain water discharge into farm land/risky areas		
8.3	Diversion of water away from natural water course		
8.4	Quality of surface water observed		
9.0	**Community infrastructures**		
9.1	Suitable reinstatement measures for disruption to community infrastructures		
10.0	**Air quality**		
10.1	Dust generation from construction work		
11.0	**Noise pollution**		
11.1	Noise from large work sites		
12.0	**Quarrying of construction materials**		
12.1	Pollution, disturbance and danger from quarry operations		
12.2	Rehabilitation of abandoned quarry sites		
13.0	**Forest and vegetation**		
13.1	Number of stumps of cut trees		
13.2	Pressure on nearby forest for firewood/timber use		
13.3	Compensatory plantation and its survival rate		
13.4	Sale of timber/NTFP increased/decreased		
14.0	**Wildlife**		
14.1	Cases of wildlife hunting by work force		
14.2	Cases of trading of wildlife products		
15.0	**Health and Occupational safety matters**		
15.1	Types and no. of accident occurred		
15.2	Adequacy of safety gadgets (helmet, facemasks, muffles, gloves etc)		

15.3	Facility of first aid and emergency services provided or not		
15.4	Compensation to the loss of life or disability		
15.5	Accidental insurance for workers		
16	**Camp site management**		
16.1	Material used for camp site construction		
16.2	Water supply and sanitary condition		
17	**Sites for cultural and religious values**		
17.1	Protection of culturally and religiously sensitive spots (temple, mane, cremation sites, mela spot etc)		
18	**Change in migration pattern**		
18.1	No. of persons migrating to other places		
18.2	No. of persons stopped migrating/return from outside		

This format will be supplemented by necessary and relevant photographs and case studies.

Annex III Number of training and participants

S. N.	Training	Event	Participants
Awareness raising Training			
1	Gender Mainstreaming Training	5	259
2	Nutrition Training	2	104
3	First Aid Training	4	2,229
4	Conflict Transformation Training	2	42
5	HIV/AIDS Training	7	618
6	Saving/Credit Training	7	376
7	Leadership Skill and Book Keeping Training	3	204
8	Institutional Development Training	3	71
9	Prenatal Care and Safe Motherhood	1	128
10	Personal Hygiene and Sanitation	1	50
	Subtotal	**35**	**4,081**
Life Skill and Income Generation Training			
11	Off Seasonal Vegetable Farming	5	226
12	Commercial Bee Keeping	2	84
13	Agarbatti (incense) making	1	15
14	Livestock Raising	3	42
15	Noodles Making	1	12
16	Small Hotel and Lodge Management	2	60
17	Lokta Collection and Refining Training	1	23
18	Entrepreneurship Training	1	19
19	Cooking Training	1	2
20	Fresh Vegetable Farming	2	62
21	Fruit Farming Training	2	71
	Subtotal	**21**	**616**
Technical Skill Enhancement Training			
22	Dry Wall Construction	1	30
23	Gabion Weaving Training	1	31
24	Mason Training	1	65
25	Driving	3	19
26	Beauty Parlor	2	14
27	Veterinary	2	10
28	Bag Weaving	1	24
29	Bio-engineering	1	7
30	Basic Computer	3	24
31	House Wiring	1	16
32	Metal Fabrication	1	7
33	Motorbike repairing	1	3
	Subtotal	**18**	**250**
	Total	**74**	**4,947**

Annex IV Case Studies

Case study 1- Change in Migration Pattern in Bajhang District due to road construction

Mr. Dhami returns from India

Construction of Vopur-Rupatola road in Bajhang district has various positive impacts in the socioeconomic conditions of the people residing along the road corridor. Most significant is the minimization in the seasonal migration of the local people to various parts of India during slack farming period. Now most of the people have stopped going to India for finding employment as they are getting job in their door steps.

During discussion with community members, it was found that about 40 persons from Sunikot VDC had already been returned from India. Mr. Bhim Bahadur Dhami of Sunikot VDC, ward no 4 is one of them. He used to go to Kedarnath area of India since last three years. He was working as a porter and earning 30-35 thousand Indian rupees per year.

Last year, Mr. Dhami heard that road construction work is going on in his own area. He returned home and started working in the road construction work as building group (BG) member. Because of this, Mr. Dhami has not only got employment opportunity, but also found enough time to spend with his family as well as assist his wife in other household activities like vegetable farming and cattle rearing. His wife and children are more happy now. So far, he has earned NRs. 27,000 within three months time. Mr. Dhami is hopeful that in the coming days he could earn more than what he was earning in India by working as BG member.

Thus, construction of this road will not only provide easy accessibility to the people but also contribute to minimize seasonal migration to India through generating employment opportunities locally. Consequently, it will improve socioeconomic condition of the local people.

Case study 2-Positive impact of income in the livelihood of BG members

Ms. Piuri's hope for better life

Ms. Piuri Chaddara (Dalit) from Sunikot VDC has never dreamed that their family members will manage to earn NRs.107,600 within 83 days of working as building group (BG) member in the road construction work funded by Decentralized Rural Infrastructure and Livelihood Project (DRILP).

She was speechless when she shared her opinion that she got same wage as men. Among the four family members one is her son who has returned from India to work as BG.

Ms. Piuri proudly said that her grand children's dreams have been fulfilled when she bought buffalo, which cost NRs. 15,500.00. In addition, they managed to buy grazing land costing NRs. 8,000 and utensils worth of NRs. 17,000.00. Similarly, her family paid back their previous loan of NRs. 18,000 and also medicine due of NRs. 14,000 to the local health worker. Most importantly, they are able to send their children to the school and feed the whole family with sufficient food especially rice. Ms. Piuri said that they are celebrating their "**Kulpuja**" (family worship) grandly by buying "**Damaha**" (local drum) and even celebrating Dashain and Tihar without taking loan.

Moreover, Piuri hopes that her family could maintain their life as it is now. Therefore, they are planning to start small business in the Sunikot village and participating life skills training being organized by the project.

Case study 3-Positive impact of income in the livelihood of BG members

A single Woman's fight for survival

Ms. Harauli Dhanuk, 41 years old became widow at a young age of 22. She is born and grown up in a poor family in Baitadi district. She shared that she had very bitter experiences of her life as she has to take care of three small children without the reliable source of income.

It was very difficult for her to manage day to day life as being a widow nobody wants to support her. It was not possible for her to get any loan from communities. However, she has managed to send her all three children to the school and fortunately one of her daughter got scholarship but still she has to arrange all necessary educational expenses for her children. It was quite tough to manage by a single person. As a result, she took loan of NRs 9,000 to support her children's education by mortgaging her land. She has also taken another loan of NRs 5,000 to buy food for his family by mortgaging Khar Bari (land for growing grasses)

Harauli Dhanuk worked from the starting in the Shreebhavar – Hat road being constructed by the Decentralized Rural Infrastructure and Livelihood Project (DRILP). She was very happy to work as a building group (BG) co-leader as it helped her to forget her bitter past experiences. She also shared that due to working as a BG co-leader, she could solve her problems easily and she had also gained confidence working in the team. So far, she had earned NRs. 15,300.00. From that money she managed to pay the loan and got back her both land. Ms. Harauli is highly satisfied of her work as BG co-leader. She is also planning to participate in the awareness raising training as well as life skills training.

Case study 4-Significant Change in Livelihood

Journey from porter to trader

Mr. Dambar Bahadur Khadka, 40 years old, standing in front of his newly built house recalls his changed lifestyle from a porter in the past with lot of hardships as a new businessman at present. Mr. Khadka, a resident of Tingla VDC ward no 6 in Solukhumbu district has two sons, a daughter and wife in his family. He has approximately 5 ropani of cultivable land hardly enough for producing food for 3-4 months. In the past, he along with his two sons used to carry 30 to 50 kg of rice bag from Okhaldhunga and Patle bazaar to Salleri, Dorpu bazaar and Nele bazaar to earn NRs.100 per bag for their livelihood. It was very difficult for them to survive with that meager income.

Dambar Bahadur never dreamt that he will become a rice wholesaler from porter. He says "I am relaxed now and feel that my hardships have been taken away by the road constructed by the Decentralized Rural Infrastructure and Livelihood Project."

Dambar Bahadur and his family members got opportunity to work as a building group (BG) member in Phaplu–Jantardhap road sub project and could manage to earn substantial amount of money from which he has invested NRs 200,000 to start wholesale business of rice. Now, he is earning net profit of NRs. 12,000 to 15,000 per month from this business.

It amazes him when he looks back his life as a porter where it was hard to have NRs 200 in the pocket and now he owns a business worth NRs 200,000. It is like a dream for him to have such a drastic change after his hard life for twenty four years. He never thought that his life would ever be any different. And now his difficult days are over as he has his own business. He gives all credit to DRILP for making his life better. He never dreamt that he can ride the vehicle at his door step. He says that it is not necessary to go abroad to earn money as one can earn a good living in our own village with dedication and hard work.

Case Study 5- Deistruction of Forest during road construction

Use of Trees for Breaking Boulders in Humla

Sallikhola-Tumkot 22.15 km long road in Humla district of Karnali zone is under construction. This road mainly passes through forest area (60%). People's movement is limited in winter due to harsh climatic condition and snow fall in most of the area. The vegetation type of the project area is temperate coniferous forest with blue pine *(Pinus wallichiana*) as dominant species.

This road in being constructed by applying labor based environment friendly and participatory (LEP) approach. Most of the area is characterized by the presence of high volume of boulders which are very difficult to break manually with simple tools. Along Foreskhargen community forest area, workers are using traditional heating and splitting method for breaking boulders which was practiced in Great Britain during mid 1600 AD. This method is being used due to the lack of hydraulic rock splitter and portable drilling machine. Though District Development Committee (DDC) is ready to provide these equipments, these equipments have not yet reached at work site. This is creating high pressure along the adjoining forests. Lots of trees have been cut indiscriminately by the workers for breaking the boulders by heating. This will ultimately result in the loss of biodiversity, occurrence of fresh landslide and acceleration of erosion along the road alignment. Consequently, sustainability of Sallikhola-Tumkot road will also be affected.

This is a serious issue and needs immediate attention from the DDC. Necessary equipments like hydraulic rock splitter and portable drilling machine should be provided at the site as soon as possible and workers and DISC staff should be oriented about the conservation of forests. Moreover, coordination with District Forest Office (DFO) should be initiated.

Annex V Photographs

Stone breaking through the wood firing at Humla

Forest along the road alignment at Baglung

Women working in road construction

Workers are using helmets during stone cutting

New market center at Dillichaur in Jumla district

Rehabilitation of irrigation canal at Solukhumbu

Toe wall to check spoil disposal in Ramechhap

Bio-engineering works at Okhaldhunga

Rehabilitation of drinking water pipeline

Gabion wall construction in Okhaldhunga

Mane before road construction (Solukhumbhu)

Mane after road construction (Solukhumbhu)