

Environmental Assessment Document

Initial Environmental Examination

Grant Number: 0093 NEP

March 2011

Nepal: Rural Reconstruction and Rehabilitation Sector Development Program

Sadhutar-Madanpur-Laxmipur-Gherabari Road Subproject, Jhapa District

Prepared by the Government of Nepal

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Government of Nepal
Ministry of Local Development
Department of Local Infrastructure Development and Agricultural Roads
Rural Reconstruction and Rehabilitation Sector Development Program
[ADBGrant 0093NEP]

Initial Environmental Examination (IEE) Report
of
Sadhutar-Madanpur-Laxmipur-Gherabari Road Subproject
Jhapa District

Submitted to:

Ministry of Local Development

Government of Nepal

Proponent:

District Development Committee/

District Technical Office

Bhadrapur, Jhapa

March, 2011

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ABBREVIATIONS

ADB	Asian Development Bank	IEE	Initial Environmental Examination
amsl	Above mean sea level	IUCN	International Union for Conservation Nature
AP	Affected Person	Km	Kilometer
BG	Building Group	LDO	Local Development Officer
Ch	Chainage	LEP	Labour based, environment friendly and participatory
CBO	Community Based Organization	LEST	Livelihood Enhancement and Skill Training
CDC	Compensation Determination Committee	LRMP	Land Resource Management Project
CDO	Chief District Officer	M	meter
CEA	Country Environmental Analysis	MoU	Memorandum of Understanding
CGI	Corrugated Galvanized Iron	MoE	Ministry of Environment
CF	Community Forest	MoST	Ministry of Science and Technology
CFUG	Community Forest Users Group	ml	Milliliter
CISC	Central Implementation Support Consultants	MLD	Ministry of Local Development
CITES	Convention on International Trade in Endangered Species of Flora and Fauna	NGO	Non-Governmental Organization
DADO	District Agriculture Development Office	NRs	Nepali Rupees
DDC	District Development Committee	NTFPs	Non timber forest products
DFID	Department for International Development	OFID	OPEC Fund for International Development
DFO	District Forest Office/Officer	OP	Operational Plan
DG	Director General	OPEC	Organization of Petroleum Exporting Countries
DIST	District Implementation Support Team	PAM	Project Administrative Memorandum
DIT	District Implementation Team	PCC	Plain Cement Concrete
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads	PCU	Project Coordination Unit
DPO	District Project Office	RBG	Road Building Group
DPCC	District Project Coordination Committee	RCC	Reinforced Cement Concrete
DRSP	District Road Support Programme	RCIW	Rural Community Infrastructure Works
DSCO	District Soil Conservation Office	REA	Rapid Environmental Assessment
DTO	District Technical Office	RES	Rapid Environmental Screening
DTMP	District Transport Master Plan	RIDP	Rural Infrastructure Development Project
EA	Environmental Assistant/Assessment	RP	Resettlement Plan
EARP	Environmental Assessment and Review Procedures	RRRSDP	Rural Reconstruction and Rehabilitation Sector Development Program
ES	Environmental Specialist	RS	Resettlement Specialist
EIA	Environmental Impact Assessment	SF	Social Funding
EMP	Environmental Management Plan	SA	Social Appraisal
EMS	Environmental Management Section	SDC	Swiss Agency for Development and Cooperation
EPA	Environmental Protection Act	SM	Social Mobilizer
EPR	Environmental Protection Rules	SMC	Social Mobilization Coordinator
ESD	Environment Screening Document	SMO	Social Mobilization Officer
FGD	Focus Group Discussion	TA	Technical Assistance
GoN	Government of Nepal	ToR	Terms of Reference
GIS	Geographical Information System	TWS	Technical Walkover Survey
Ha	Hectare	VDC	Village Development Committee
HH	Household	VICCC	Village Infrastructure Construction Coordination Committee
		ZoI	Zone of Influence

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Executive Summary

Background

Government of Nepal has received financial assistance from ADB, SDC, DFID and OFID for implementation of the Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP). The RRRSDP aims for reconstruction and rehabilitation of rural infrastructures damaged in the twenty conflict affected districts of the country. The Proposed 43.70 km long Sadhutar-Madanpur-Laxmipur-Gherabari Road in Jhapa District is one of the Subprojects selected under the RRRSDP. It is an existing road proposed for upgrading in Blacktop standard. Although in ToR, it is mentioned that the road starts from Sadhutar of Khudnabari VDC and ends at Gherabari of Gherabari VDC but after detail design the starting point is Gherabari and end point is Sadhutar.

Project Proponent

The 'Proponent' of the proposed Subproject (Proposal) is District Development Committee (DDC), District Technical Office (DTO), Jhapa District. Ministry of Local Development (MoLD) is the 'Concerned Agency' for approving the IEE study.

Objectives of the IEE Study

The objectives of the IEE study is to identify the impacts on the physical, biological, socio-economic and cultural environment of the project influence area from construction and operation of the Proposal, and recommend site-specific adverse impact mitigation measures and beneficial impact augmentation measures. The Study will assess if the IEE level study is sufficient for the Subproject.

Relevancy of the Proposal

The proposed Subproject will connect the southern part Gherabari and northern part Shadutar of Jhapa district to East West highway. It will provide easier access to people to social services, and market access for local products like rice, mango, coconut, betel nut, vegetables and milk. As a result, the subproject will assist to promote economic activities, reduce poverty and increase socio-economic conditions of the people of the area.

Study Methodology

The IEE study has been conducted through review of secondary information collected from relevant agencies, and primary information collected from the field survey on November 2009. The survey methods included walk-through survey along the proposed alignment with checklists, conduction of sample household survey, organizing focus group discussions (FGD) in the related VDCs, and information supplemented by the resettlement and technical team of the Subproject.

The IEE report has been prepared following the Environmental Protection Act, 1997 and Environmental Protection Rules, 1997 (second amendment 2007) of the Government of Nepal (GoN); and Environmental Assessment Guidelines, 2003, and Safeguard Policy Statement, 2009 of ADB. The report follows the Terms of Reference for IEE Study approved by MoLD on 8 October, 2009 (22/06/2066 BS).

Brief Description of the Subproject

The proposed road starts from Gherabari and ends at Northern part of Jhapa district at Shadutar. The 43.700 km road is already motorable. The road passes through Gherabari, Rajgad, Chakchaki, Dangibari, Ghailadubba, Arjundhara and Khudunabari Village Development Committees (VDCs). The average formation width of road is 6 m. Total project cost is NRs. 14,90,61,122.46 and per km cost is NRs. NRs.79,17,832.92.

Existing Environmental Condition

The road starts from Gherabari of Gherabari VDC at 61 m amsl and passes through Sadhutar at 80 m amsl. As the proposed road lies in Terai, therefore no any landslide problems have been observed. Ambient air and water quality of the proposed project area is observed to be good and there is no noise pollution. The road passes through cultivated land and settlements.

The dominant vegetations found in the road alignment on private lands are Sisso (*Dalbergia Sisso*), Mango (*Magnifera Indica*), Coconut (*Cocos nucifera*), Betelnut (*Areca catechu*), Bamboo (*Bambusa vulgaris*), Kadam (*Anthrocephalus chinensis*) and Peepal (*Ficus religiosa*). No any wild animals are found within the Zol but, *Corvus splendens* (Crow), *Passer domesticus* (Sparrow), *Columba livia* (Pigeon), Parrot are the birds found in the Subproject area. The road does not fall under any protected area or their buffer zones. Total population of the Subproject area is 26375 and total household number is 5262, and average family size is 5.01. Brahmin, Chettri, Rajbanshi, Yadav, Limbu, Tamang are the main castes living in the area. Indigenous people, Satar & Meche are also present in the Project area with population of 1214

Subsistence agriculture and livestock farming are the main occupation. Due to limited transportation facilities agriculture farming is not enough for subsistence level. Moreover, significant percentage of the economically active male population also migrates to various places including towards Birtamode and various part of India and abroad.

Major Environmental Impacts

Beneficial Impacts

The immediate benefit from this road Subproject is employment opportunities. The implementation of Subproject require about 86,952 person days of unskilled and 22,360 person days of skilled manpower. The project will give priority to the poor, ethnic minorities and disadvantaged local people for employment opportunity. Other beneficial impacts include enhancement of local business, development in skills of local people from skill developing training, awareness raising training and involvement in the construction of the project.

During operation stage of road, the people from the Zone of Influence (Zol)¹ will get easy and fast accessibility to markets, social services and other regions of the country. This will ensure better economic condition and food security of the people living in the Zol of the project area. Moreover this will promote the small agro based industries that uses local resources. Easy access and opportunity of better transportation system will develop other sectors like education, health, communication, market, banking and other socio-economic sectors. This will increase the overall living condition of the people living in Zol of project area. The better land network will result in increased land price which will be beneficial for land owners. Black topped road will reduce dust pollution.

Adverse Impacts

Some adverse environmental impacts are likely to result from the proposed upgrading of road works. Disposal of soil and earth material, operation of quarries might result in on erosion during construction and operation. Furthermore, spoils generated during construction can create the water pollution to the nearby water sources.

There will be no change in land use, since the road will be upgraded and widened under the existing width of 6m and no additional acquisition of land is necessary, no trees are required to cut down during road construction. Embankment erosion are at Ch 3+350, 9+350 and 12+900. The irrigation canal at Ch 0+600, 3+470, 6+500, 7+300, and 8+600 crosses the road which will block during road construction. Access road will affect during road construction. Labours and local people are prone to health effects and accidents relating to construction activities.

During operation stage, monsoon rain, might result in erosion in embankment of road. The flowing water on the side drain of the road might cause erosion of soil on adjacent agricultural land. Vehicular

¹ Zol is one and half hour walking distance from the road alignment.

emissions will result in air and noise pollution. New settlement, bazaar area will be expanse and this may increase encroachment of the RoW.

Mitigation Measures

The various benefit augmentation measures and adverse impact mitigation measures have been proposed in the report to make this project environment friendly. The construction of road will be based on both Contractor and RBG based. Affected families will be given high priority for employment and skill development trainings. Necessary measures will be taken to reduce the adverse effects that might arise from earthworks, pavement works, operation of construction vehicles and equipments, disposal of spoils and quarrying activities. Necessary trainings and awareness programs will be conducted. Bioengineering will be done for roadside greenery. At construction site, the workers will be provided insurance, first aid facilities and safety equipments. For reinstate of community infrastructures mitigation cost has been allocated. Proper maintenance and proper drain system will be provided to prevent accumulation of water on the nearby agricultural lands during operation. Adequate road safety measures will be provided to minimize road accident.

Environmental Management Plan

Environmental management plan is prepared to ensure the implementation and monitoring of mitigation measures for minimizing adverse impacts and maximizing the beneficial impacts. The necessary mitigation measures together with environmental monitoring process and responsible bodies for environmental monitoring have been identified. Similarly, for environmental monitoring various sections of physical, biological, socio-economic and cultural environment have been identified to generate useful information and improves the quality of implementation of mitigation measures.

The cost for implementing environmental management plan has been identified as follows:

SN.	Description	Amount (NRs.)
1	Environmental awareness raising training and other training	150,000
2	Insurance of workers	1,000,000
3	Bio-engineering/ Roadside Tree Plantation	347,959.50
4	Construction of access Road, reinstate of affected infrastructures, stockpiling etc.	2,000,000
5	Social Cost	200,000
6	Occupational health and safety, Information signboard	500,000
7	Monitoring	200,000
	Total	4,397,959.50

Conclusion and Recommendation

The identified environment impacts will be seen in limited small areas and mainly during construction period. The implementation of proposed mitigation measures for identified adverse impacts will minimize as well as mitigate the adverse impacts on environment. The Resettlement Plan and compensation to the affected households should be ensured. The implementation of measures as described in environmental management plan will mitigate the negative impacts on physical, biological, socio-economic and cultural environment. Therefore, this IEE is sufficient for approval of the proposed sub-project, and recommended for implementation with incorporation of mitigation measures and environmental monitoring plan. Therefore, the proposed Subproject does not require Environmental Impact Assessment.

1. INTRODUCTION

1.1 Background

1. The Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP) focuses on immediate post conflict development priorities for accelerated poverty reduction and inclusive development, thereby enhancing the effectiveness and efficiency of the delivery of public services, and improving access of rural people to economic opportunities and social services. The Program is financed by the Government of Nepal (GoN), Asian Development Bank (ADB), Department for International Development (DFID), Swiss Development Cooperation (SDC), Nepal and OPEC Fund for International Development (OFID). The Program covers twenty districts spread over the country. Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) under the Ministry of Local Development (MoLD) is the executing agency (EA). The District Development Committees (DDCs) / District Technical Office (DTO) are the Project Implementing Agencies. The DDC/DTO are supported by District Implementation Support Team (DIST) with engineering, safeguards and social mobilization responsibilities.

2. Jhapa District is one of the project districts under RRRSDP. This Proposal is for upgrading in bituminous standard of the 43.700 km long Sadhutar-Madanpur-Laxmipur-Gherabari Road in Jhapa District.

1.2 The Name and Address of Proponent

Name of Proposal	:	Upgrading of Sadhutar-Madanpur-Laxmipur-Gherabari Road, Jhapa District
Name of Proponent	:	District Development Committee, District Technical Office, Jhapa
Address of Proponent	:	Bhadrapur, Jhapa District
		Phone No: 023-456273
		Fax No: 023-456273
Name of Preparer	:	Mr. Prakash Chaudhary (Environmental Specialist- DIST Jhapa)

1.3 Relevancy of the Proposal

3. The Project area is located at remote and underdeveloped central part of Jhapa district in Eastern part of Nepal. The road is currently graveled and motor able in fair-weather. The area has high potential in production of vegetable, fruit and milk. In this regard, the proposed rehabilitation of the road will enhance access of people to social services and market centers with significantly reduced travel time and cost, and will contribute in their socio-economic development. Access shall also attract other development infrastructures and open door to further development opportunities in the area. The total length of the road alignment was 43+800 Km as in approved ToR but after detail survey the alignment length was changed to 43.700Km.

1.4 Need and Objectives of the IEE Study

4. **Need:** An IEE study of the Proposal is a legal requirement according to the Environment Protection Act, 1997; and Environment Protection Rule, 1997 (Amendment 2007) of GoN; and according to the provisions of the Environmental Assessment Guidelines, 2003; and Safeguard Policy Statement, 2009 of ADB.

5. **Objectives:** The main objective of the IEE study is to identify the impacts from the construction and operation of the Proposal on the physical, biological, socio-economic and cultural environment of the Subproject area. The IEE study recommends practical and site specific environmental mitigation and enhancement measures, prepare and implement environmental monitoring plan and make sure that IEE is sufficient for the proposed road sub-project.

1.5 Methodology Adopted

6. The IEE study has followed the provisions of the EPA, 1997 and EPR, 1997, and the provisions of ADB. It follows methodology suggested in the approved Terms of Reference for IEE Study (Refer Annex 1). For the collection of environmental features related to bio physical environment, maximum 100 meter distance observable from the centre of the road alignment was taken as an influence area and socio-

economic and cultural environment was taken of Zol (one and half hour walking distance from the centre line of the road) information of the Subproject area. The IEE study has been conducted through review of secondary information collected from relevant agencies, and primary information collected from the field survey in November 2009. The IEE report is based on the Terms of Reference for IEE Study approved on 8 October, 2009 (22/06/2066 BS) by MoLD which is given in Annex (1). Field survey, sample household survey, organization of Focus Group Discussions in the related VDCs was carried out and necessary information was collected. The DDCs officials, VCDs and Community Groups were also contacted to verify information to solicit their concerns. Based on the analysis of information the impacts have been predicted, mitigation measures prepared and monitoring plan has been developed.

1.6 Public Consultation

7. In order to ensure the involvement of concerned stakeholders, following procedures were followed:
 - Publication of Public Notice- a 15 days public notice was published on 29/06/2066 in the Rajdhani national daily newspaper (see Annex V) seeking written opinion from the concerned VDCs, DDC, schools, health posts and related local stakeholders. A copy of the public notice was also affixed in the offices of the above mentioned organizations and *Deed of Enquiry (muchulka)* was collected (see Annex VI and Annex VII).
 - Interaction with local communities and related stakeholders like District Forest Office, District Soil Conservation Office, District Agricultural Development Office and others were carried out during field survey to collect the public concerns and suggestions (see Annex VIII). Focus Group Discussions were conducted in all the four VDCs to collect and solicit their suggestions on protection of bio-physical and socio-economic environment in the Zone of Influence (ZOI) of the road. Summary of minutes of meeting is given in Annex IX and following Table 1.1.
 - Draft IEE report was kept at information center of DDC, Jhapa and Gherabari, Rajgad, Chakchaki, Dangibari, Ghailadubba, Arjundhara VDCs for public disclosure. Information was also disseminated through person to person contacts and interviews and group discussions. Recommendation Letters for implementation of the Proposal were also obtained from all the concerned VDCs (see Annex X).

Table 1.1: Summary of FGD Meeting Conducted Under IEE Study

Location	VDC	Date	No. of Participants	Decision
Chakchaki	Chakchaki VDC	26/5/2066		1. Priority should be given to local people in employment opportunities.
Rajgad	Rajgad VDC	26/5/2066		2. There will be no conflict during road construction. If conflict arises it will be solved by VICCC.
Arjundhara	Arjundhara VDC	27/5/2066		3. There will be no discrimination on dissemination of payments during road construction.
Ghailadubba	Ghailadubba VDC	29/5/2066		4. People are agreed to work in rate as given in DPR and benefitted people agreed for volunteer contribution as required during road construction.
Gherabari	Gherabari VDC	28/5/2066		5. No major environment issue raised during FGD meeting.

8. The approved IEE report is accessible to interested parties and general public through the websites of ADB and MoLD/DoLIDAR. The copy of approved IEE report has been distributed to following offices:

1. District Development Committee, Jhapa
2. District Technical Office, Jhapa
3. District Project Office, Jhapa
4. District Implementation Support Team, Jhapa
5. Ministry of Local Development, Environment Management Section
6. Department of Local Infrastructure Development and Agricultural Roads
7. Project Coordination Unit, RRRSDP
8. Asian Development Bank, Nepal Resident Mission

2. DESCRIPTION OF THE PROPOSAL

9. The proposed 43.7km long graveled road lies in Jhapa District constructed 30 yrs ago. It links the remote Northern area Shadutar of the district to remote Southern part Gherabari. It is already motor able but in worse condition. The road passes through Gherabari, Rajgad, Chakchaki, Dangibari, Ghailadubba, Arjundhara and Khudunabari Village Development Committees (VDCs) (see in Figure 1.1 and 1.2). The total width of road is 6 m. Earthwork in excavation and Embankment Preparation, sub-grade, sub-base, base, Premix carpeting work and bioengineering etc is planned to be implement under the proposed upgrading of the road. The total project cost is NRs.14, 90, 61,122.46 and per km cost is NRs. NRs.79, 17,832.92.

2.1 Salient Features of the Subproject:

- | | |
|-----------------------------------|---|
| 1. Name of the sub-Project | : Sadhutar-Madanpur-Laxmipur-Gherabari Road |
| 2. Location | |
| <u>Geographical Location</u> | |
| i. Region: | Eastern Development |
| ii. Zone: | Mechi |
| iii. District: | Jhapa |
| iv. VDCs: | Gherabari,Rajgad,Chakchaki, Dangibari, Ghailadubba, Arjundhara and Khudunabari |
| v. Latitude: | N 26°44.941' |
| vi. Longitude: | E 88° 01.143' |
| vii. HH/Population served: | 5262 / 26375 |
| <u>Geographical Feature</u> | |
| i. Terrain: | Plain |
| ii. Climate: | Sub-tropical |
| 3. Road type: | District Road |
| 4. Standard of Pavement | Premix Carpeting |
| 5. Length of Road | 43.7km |
| i. Starting point: | Gherabari |
| ii. End point: | Shadutar |
| 6. Settlement: | Gherabari,Bhagudubba bazaar, Rajgad, Chakchaki, Philbari, Ghailabudda, Laxmipur, Bhangbari, Madanpur, Sisne,Sadhutar. |
| 7. Design Criteria | |
| i. Design speed | 40 km /hour |
| ii. Maximum gradient | 5% |
| 8. Cross section | |
| i. Right of way | 5m each side (from center line) |
| ii. Formation width | 6m(8.5 m at Settlement area) |
| iii. Carriage way width | 3m(4.5 m at settlement area) |
| iv. Shoulder width | 1.5 m on either side(2m at settlement area) |
| v. Side drain | non |
| 9. Structure | |
| <u>Cross Drainage Structure</u> | |
| i. Hume pipe culvert | 3 Proposed |
| ii. Concrete causeway | 2 existing |
| iii. Slab Culvert | 0 no |
| iv. Bridge | 3 existing at ch 0+650, 12+950 and 30+800 |
| <u>Retaining Structure</u> | |
| i. Gabion wall | 302 cum |
| ii. Dry stone wall | 0 |
| iii. Cement masonry wall | 0 |

Earthwork

i.	Cutting cum	340.46
ii.	Filling	31558.16cum
10. Project Cost		
i.	Cost of civil Works	NRs 149,061,122.46
ii.	Cost per km	NRs 79, 17,832.92

11. Employment generation:

i	Total employment	:	109312 (person days)
ii	Skilled	:	22360
iii	Unskilled	:	86952

12. DTMP Code 04A015R

2.2 Construction Approach and Activities

10. The construction approach will be Contractor based and Labour-based, Environment-friendly and Participatory (LEP) approach.

11. Activities included during the road construction are: earthwork, retaining structures, bioengineering, cross drainage works are side drain works and Premix Carpeting.

2.3 Proposed Schedule for Implementation of Subproject

12. Following Table 2.1 shows the proposed implementation schedule of the Subproject:

Table 2.1: Subproject Implementation Schedule

SN	Activity	2008 IV	2009				2010				2011			
			I	II	III	IV	I	II	III	IV	I	II	III	IV
1	Detailed survey and design													
2	Preparation of resettlement plan													
2.1	Life skill and income generation training													
3	Environment Assessment and Monitoring													
3.1	IEE report preparation and approval													
3.2	Implementation of EMP													
3.3	Environmental monitoring													
4	Construction Work													
4.1	Civil construction work by contractors													
4.2	Civil construction work by RBGs													

Note:

I -January, February, March II - April, May, June III - July, August, September IV - October, November, December

Figure 2.1: Map of Nepal showing the location of : Sadhutar-Madanpur-Laxmipur-Gherabari RoadSubproject in Jhapa District

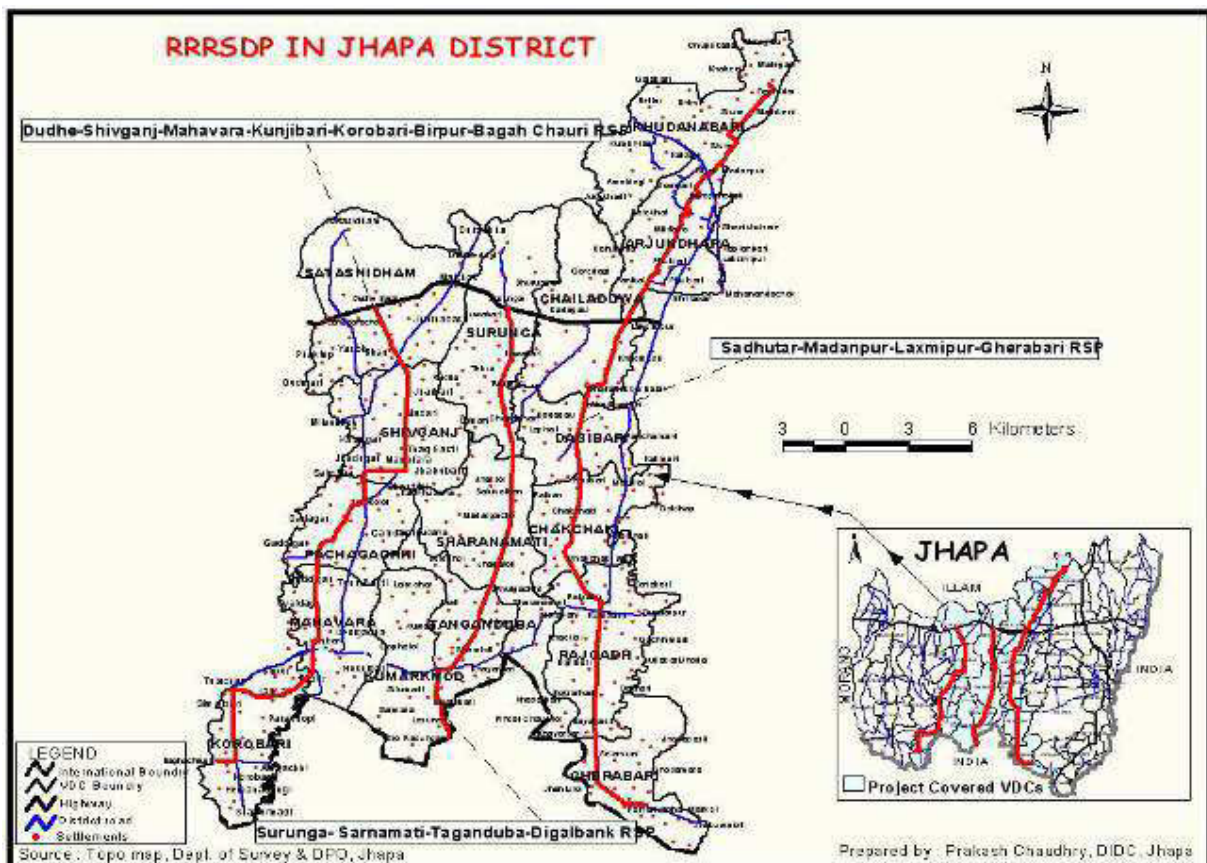
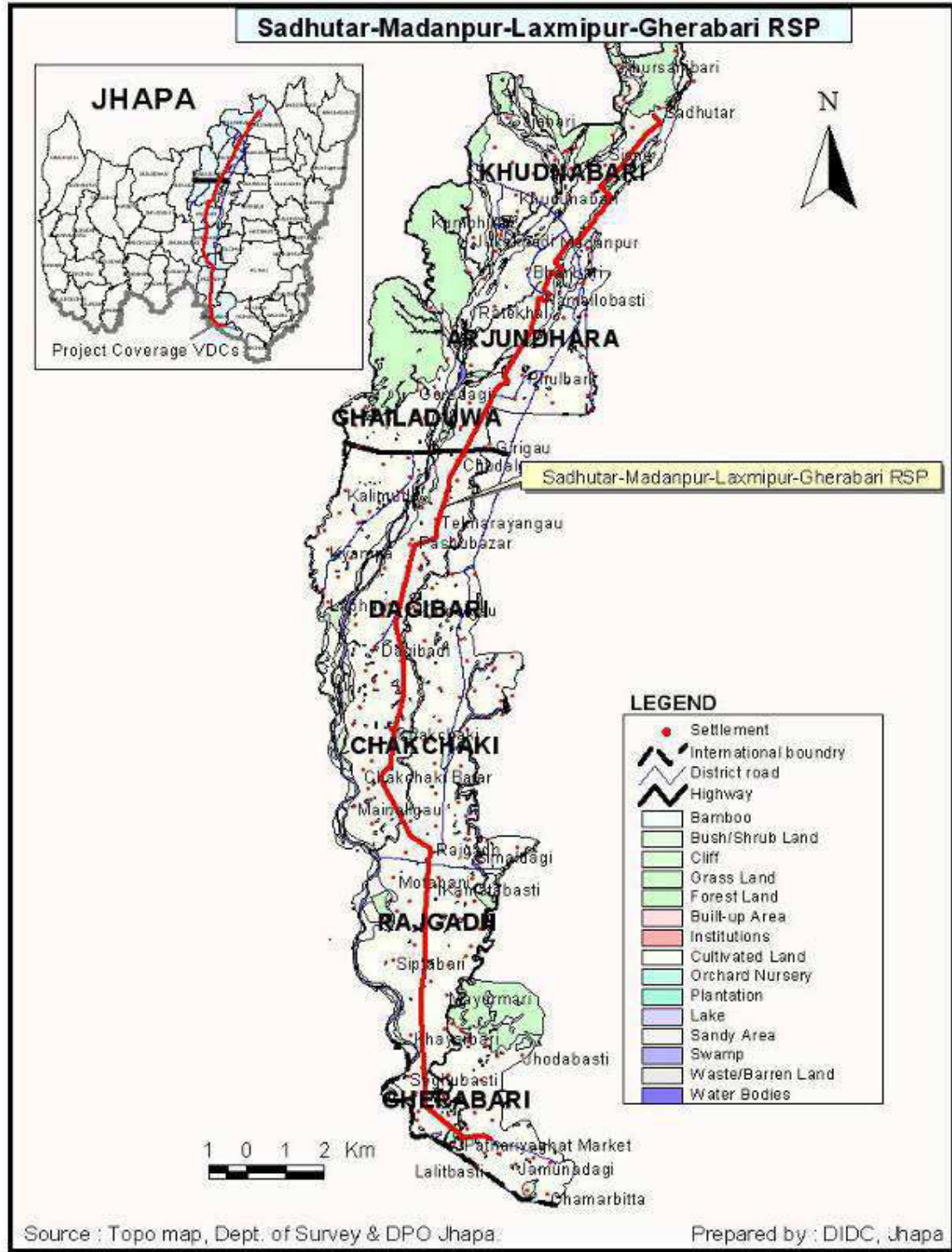


Figure 2.2: Alignment of Sadhutar-Madanpur-Laxmipur-Gherabari Road Subproject



3. REVIEW OF RELEVANT ACTS, REGULATIONS AND GUIDELINES

13. The IEE study has followed the provisions of following acts, regulations and guidelines of Government of Nepal and ADB to ensure conservation of environment during proposal implementation and operation.

Table 3.1: Review of Environmental Acts, Regulations and Guidelines

SN	Environmental Acts, Regulations and Guidelines	Description of Requirements
1	Three Years Interim Plan, 2007/08-2009/10, GoN	Requires all projects will be formulated and constructed based on methods that optimally utilize the local skill and resources and generate employment opportunities.
2	Environmental Protection Act, 2053 BS (1997 AD), GoN	Any development project, before implementation, shall pass through environmental assessment, which will be either IEE or an EIA depending upon the location, type and size of the projects.
3	Environmental Protection Rule 2054 BS (1997 AD), GoN	The EPR and its schedules clearly provide various step-wise requirements to be followed while conducting the IEE study. It also obliges the Proponent to timely consult and inform the public on the contents of the proposal and IEE study.
4	Forest Act, 2049 BS (1993 AD), GoN	Requires decision makers to take account of all forest values, including environmental services and biodiversity, not just the production of timber and other commodities. It includes several provisions to ensure development, conservation, management, and sustainable use of forest resources based on approved work plan.
5	Forest Rules, 2051 BS (1995 AD), GoN	Elaborates legal measures for the conservation of forests and wildlife. Expenses incurred for cutting trees and transportation shall be borne by proponent.
6	<i>Batabaraniya Nirdesika</i> (Nepal; MLD), 2057, GoN	The directive is focused in the practical implementation of small rural infrastructures through the minimization of environmental impacts. This directive includes the simple methods of environmental management in the different phases of the project cycle.
7	Local Self Governance Act 2055 BS (1999 AD) (1999) and Regulation 2055 BS (1999 AD), GoN	Empowers the local bodies for the conservation of soil, forest and other natural resources and implements environmental conservation activities
8	Land Acquisition Act, 2034 BS (1977 AD) and Land Acquisition Rules, 2026 BS (1969 AD), GoN	Specifies procedural matters on land acquisition and compensation
9	National Environmental Impact Assessment Guidelines, 1993 (2050 BS), GoN	Provides guidance to project proponent on integrating environmental mitigation measures, particularly on the management of quarries, borrow pits, stockpiling of materials and spoil disposal, operation of the work camps, earthworks and slope stabilization, location of stone crushing plants etc.
10	APPROACH for the Development of Agricultural and Rural Roads, 1999 (2055 BS), GoN	Emphasizes labor based technology and environmental friendly, local resource oriented construction methods to be incorporated actively in rural infrastructure process.

SN	Environmental Acts, Regulations and Guidelines	Description of Requirements
11	RRRSDP Environmental Assessment & Review Procedures (EARP), 2007, GoN	For preparation of environmental assessments of future subprojects under Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP), this EARP includes: i) The process to be adopted while preparing environmental reports, ii) the potential environmental impacts that could result from undertaking the Project based on the Initial Environmental Examinations (IEEs) of sample core subprojects; iii) the proposed mitigation measures to avoid the identified impacts; iv) institutional capacity assessment and strengthening arrangements; v) legal framework for environmental assessment, domestic and the Asian Development Bank (ADB) environmental assessment and review procedures; and finally vi) the approaches to be adopted during implementation of the Project in order to ensure that environmental aspects are dealt with in a comprehensive manner.
12	Reference Manual for Environmental and Social Aspects of Integrated Road Development, 2003 (2060 BS), GoN	Suggests stepwise process of addressing environmental and social issues alongside the technical, financial and others
13	Green Roads in Nepal, Best Practices Report: An Innovative Approach for Rural Infrastructure Development in the Himalayas and Other Mountainous Regions, 1999 (2055 BS), GoN	Focuses on participatory, labor based and environment friendly technology with proper alignment selection, mass balancing, proper water management, bioengineering and phased construction
14	Environmental Assessment Guidelines, 2003, ADB	Requires that environmental considerations be incorporated into ADB operations where environmental assessment is the primary administrative tool to integrate environmental considerations into decision-making of all types of development initiatives
15	Safeguard Policy Statement, 2009, ADB.	ADB's Safeguard Policy Framework consists of three operational policies on the Environment, Indigenous people and Involuntary resettlement. It requires that (i) impacts are identified and assessed early in the project cycle, (ii) plans to avoid, minimize, mitigate or compensate for the potential adverse impacts are developed and implemented and (iii) affected people are informed and consulted during project preparation and implementation.
16	The Interim Constitution of Nepal, 2063 (2007).	Has provision of right regarding environment - Every person shall have the right to live in clean environment.
17	The Labor Act, 2048 BS (1992 AD)	Regulates the working environment and deals with occupational health and safety.
18	Child Labor (Prohibition and Regulation) Act, 2056 (2000)	No child having not attained the age of 14 years shall be engaged in works as a laborer.

4. BASELINE ENVIRONMENTAL CONDITION IN THE SUBPROJECT AREA

14. Baseline information on the existing physical, biological, socio-economic and cultural environment of the zone of influence (Zoi) of the proposed Subproject is described in this Chapter.

4.1 Physical Environment

4.1.1 Topography

15. The proposed road lies in Terai. The highest elevation of the proposed road at end point at Sadhutar is 80m amsl and lowest elevation at starting point Gherabari is 61 m amsl. The location of the road is at N 26°44.941' north (latitude) and 88°01.143" east (longitude). The topographical setting of the road section is characterized by flat plain sloping gently to the south.

4.1.2 Geology and Soil Type

16. Most of the soils in the proposed road alignment area are alluvium soil, sandy with ordinary soil.

4.1.3 Land Use

17. Land use pattern of the area through which the road passes have been classified into two types: cultivated land and built up area as shown in Table 4.1.

Table 4.1: Summary of Land Use Pattern along the Road Alignment

Type of Land	Chainage		Length(m)	Existing Width(m)	Additional Width (m)	Existing area (ha)	Additional Area (ha)
	From	To					
Built up area	0+000	0+800	800	9m	0m	0.72	No
	7+000	7+500	500	9m	0m	0.45	No
	11+400	12+200	800	9m	0m	0.42	No
	15+400	15+900	500	9m	0m	0.45	No
	18+000	18+500	500	9m	0m	0.45	No
	22+300	22+600	300	9m	0m	0.27	No
	27+100	27+700	600	9m	0m	0.54	No
	38-700	39+000	300	6m	0m	0.18	No
Sub total			5300			4.08	
Agricultural land	0+800	7+000	6200	6m	0m	3.72	No
	7+500	11+400	3900	6m	0m	2.34	No
	12+200	15+400	3200	6m	0m	1.92	No
	15+900	18+000	2100	6m	0m	1.26	No
	18+500	22+300	3800	6m	0m	2.28	No
	22+600	27+100	4500	6m	0m	2.7	No
	27+700	38-700	11000	6m	0m	6.6	No
	39+000	42+000	3000	6m	0m	1.8	No
Sub total			28500			23.04	
Total (Built up area + Agriculture land)			43700			27.12	

Source: Field Survey, November, 2009

4.1.4 Climate

18. The road lies in the Sub-tropical climatic region. Rainy season starts from June and ends in September. The meteorological record shows on an average Jhapa gets 2451.3 mm of annual rainfall. Average minimum temperatures of 8°C and average maximum temperature of 34 °C is observed in the area.

Table 4.2: Meteorological Records from Jan –Dec 2004

Year/Month		Temperature		Rainfall
		Maximum	Minimum	
2004	January	23.0	8.8	20.4
2004	February	27.5	11.3	0.00
2004	March	31.7	17.6	10.2
2004	April	31.4	20.5	93.2
2004	May	32.8	22.7	245.3
2004	June	33.3	23.7	308.7
2004	July	31.6	24.1	903.0
2004	August	34.2	24.9	327.1
2004	September	33.2	23.3	412.7
2004	October	31.9	18.7	130.7
2004	November	30.6	13.0	0.00
2004	December	27.4	11.3	0.00
				2451.3

Source: District Profile of Jhapa, 2063

4.1.5 Hydrology and Drainage System

19. There are Three major rivers, Berang Khola, Ghagra Khola and Bering Khola along the road alignment lying at Chainage 0+650, 12+697 and 30+800 respectively. No wetlands are found within the vicinity of the road. There is existing 1 damaged RCC causeway along the road alignment over Bering River.

4.1.6 Soil Erosion and Sedimentation

20. The road alignment lies in Proposed alignment does not pass through landslides or erosion-prone areas.

Table 4.3 : Geological Features along the Road Alignment

Chainage		Terrain slope	State of Land	Land Use Pattern	Geological Problem
From	To				
0+000	0+800	Plain	Dry	Built up area	No
7+000	7+500	Plain	Dry	Built up area	No
11+400	12+200	Plain	Dry	Built up area	No
15+400	15+900	Plain	Dry	Built up area	No
18+000	18+500	Plain	Dry	Built up area	No
22+300	22+600	Plain	Dry	Built up area	No
27+100	27+700	Plain	Dry	Built up area	No
38-700	39+000	Plain	Dry	Built up area	No
42+000	43+000	Plain	Dry	Built up area	No
0+800	7+000	Plain	Dry	Cultivated land	No
7+500	11+400	Plain	Dry	Cultivated land	No
12+200	15+400	Plain	Dry	Cultivated land	No
15+900	18+000	Plain	Dry	Cultivated land	No
18+500	22+300	Plain	Dry	Cultivated land	No
22+600	27+100	Plain	Dry	Cultivated land	No
27+700	38-700	Plain	Dry	Cultivated land	No
39+000	42+000	Plain	Dry	Cultivated land	No
43+000	43+700	Plain	Dry	Cultivated land	No

Source: Field survey, November 2009

4.1.7 Existing Road Condition

21. The whole road is graveled from chainage 0+000 to Chainage 43+700 km but in worse condition. Average width of the road is 6m.

4.1.8 Air, Noise and Water Quality

22. The air, noise and water quality are not measured or tested, but are observed to be within acceptable limit. Dust emission during vehicle operation has been a nuisance which becomes more significant during dry and winter seasons.

4.2 Biological Environment

23. This alignment does not pass through any national park, protected area or their buffer zones.

4.2.1 Vegetation

24. The dominant vegetations found along the road alignment on private lands are Sisso (*Dalbergia Sisso*), Mango (*Magnifera Indica*), Coconut (*Cocos nucifera*), Betelnut (*Areca catechu*), Bamboo (*Bambusa vulgaris*), Kadam (*Anthrocephalus chinensis*), and Peepal (*Ficus religiosa*).

4.2.2 Forest

25. The road does not pass through any type of forest.

4.2.3 Wildlife

26. Wildlife like Common Mongoose (*Herpetes edwardsii*) and Jackal (*Canis aureus*) are found in Zol. Crow (*Corvus splendens*), Sparrow (*Passer domesticus*), Pigeon (*Columba livia*), Bakula, Parrot (*Cacatua sp.*) are the birds found in the Subproject area.

4.2.4 Aquatic Life

27. Three major rivers, Berang Khola, Ghagra Khola and Bering Khola along the road alignment lying at Chanage 0+650, 12+697 and 30+800 respectively where local fishes like Rau, Nadiyari, Katla, Magur etc are found.

4.2.5 Endangered and protected species

28. Faunal species: Common Mongoose (*Herpetes edwardsii*) and Jackle (*Canis aureus*) is listed in CITES Appendix-III.

4.3 Socio-economic and Cultural Environment

4.3.1 Population, Household and Ethnicity

29. The demographic profile of the concerned VDCs is presented in following Table 4.4. Major castes in the area are Rajbanshi, Chhetri, Brahman, Yadav, Limbu, Tamang and Dalit. Indigenous people Satar, Meche are also present in the Project area with population of 1214.

Table 4.4: Demographic Profile of VDCs

VDC	Population			HH	Average HH Size
	Male	Female	Total		
Gharabari	1087	1013	2100	423	4.96
Dangabari	954	869	1823	353	5.16
Chakchaki	1683	1583	3266	682	4.78
Arjundhara	2431	2394	4825	957	5.04
Ghailadubba	2616	2484	5100	997	5.12
khujunabari	2313	2138	4451	907	4.90
Rajghad	2565	2245	4810	943	5.10
TOTAL	13649	12726	26375	5262	5.01

Source: Field Survey, November 2009

4.3.2 Main Occupation

30. The main occupation of the area is Agriculture labour (12.33%), Businee and Commerce (5.05%), Agriculture & Livestock (33.58%), Empoloyee (3.15%) and household working abroad is 7.37%. Details of Distribution of households by Occupation are given in **Annex XI d**.

4.3.3 Market Centres and Business Facilities

31. There are 587 shops (hotel and restaurant, tea shops, grocery shops, stationery, medicine, tailoring etc.) and 39 rice mills present within the Zol of the subproject area.

4.3.4 Local Economy

32. The economy of the area is predominantly (46% of the population) agriculture-based. Rice is the main agricultural crop grown in this area. Local people are gradually attracted towards cultivation of cash crops such as fruits like coconut, mango, betel nut and off season vegetable. Dairy production and selling it to the local market has been also another source of income for local farmers. Cultivation of fruits and vegetables for commercial purpose aiming major market of Jhapa such as Laxmipur, Rajgad, Birtamode, Damak and Kakadvitta seems to be increasing. Local people also do business activities in Laxmipur, Rajgad Bazaar, Chakchaki and Fulbari Bazaar area.

4.3.5 Agriculture Pattern

33. Major crops grown in the Subproject area are rice, wheat, maize, potato and beans. Major cash crops grown in the area are mustard, vegetable, and fruits like coconut, mango and betel nut.

4.3.6 Livestock

34. Due to availability of good number of fodder trees and grazing land, the Subproject area has good potentiality of cow and buffalo farming for dairy, and goat farming for meat. People have kept buffalo and sell milk since 2030 B.S.

4.3.7 Industry

35. Some local people are engaged in weaving of bamboo products, making furniture, dairy production, Tea production, and tailoring. The area has high potentiality for agro-based industries. There are 39 nos. of rice/flour mill and 2 milk collection centers are available within Zol.

4.3.8 Tourism Potential

36. The Subproject area has potentiality of eco-tourism development. Some lodges are in operation in in Laxmipur and Rajgad Bazaar area.

4.3.9 Health and Sanitation

37. People use water from Tube well and Tap. Open defecation is also prevalent. Major health problems observed in the area are gastric, water borne diseases, gout, respiratory diseases, skin disease, malnutrition, and typhoid. Sanitation awareness among local people is increasing and many of them have toilets in their home, but there is no public sewerage system.

4.3.10 Public Services and Infrastructures

Table 4.5: Public Services and Infrastructures along the Road Alignment

Type of Public Service and Infrastructure	Chainage/ Location	Distance from the Road CL
Public Health Post	0+000	RoW
Berang Bridge	0+650	Across the road
Slab Culvert	5+341	Across the road
Hulaki Sadak Crossing	10+600	Across the road
Ghagra Bridge	12+967	Across the road
School	14+700	RoW
Chakchaki Secondary School	17+700	RoW
Ghailadubba High School	23+500	RoW
East-West Highway crossing	27+300	Across the road
Temple	27+400	Across the road
Secondary School	29+100	RoW
Bring khola Crossing	30+800	Across the road
Secondary School	37+900	RoW
Health Post	42+600	Across the road
Secondary School	42+700	Across the road
Sadhutar Temple	43+700	RoW
Access road	0+800, 1+500, 3+600, 7+100, 14+100 -----	

Source: Field Survey, November 2009

4.3.11 Existing Traffic Situation

38. Five regular passenger buses daily ply on the road, whereas about 15 numbers of mini truck/pick-up and 560 motorcycles are found to operate in the road.

4.3.12 Land Holding Pattern

39. Land holding pattern within the Zol of the road demonstrates that about 28.22% of households have less than 1 ropani (approx. 1 ha=19.8 ropani) land while 22.65%, 15.58%, 16.38%, 13.32% and 3.85% of households have 1-5 ropani, 5-10 ropani, 10-20 ropani, 20-50 ropani and more than 50 ropani respectively. Details of Distribution of households by Land Holding Pattern are given in **Annex XI b**.

4.3.13 Food Security

40. About 47.56 % of household have food Security only for upto 3 months while about 12.14%, 6.72% and 33.58% of households have food Security upto 3-6 months, 6-9 months and 9-12 months respectively. Food Sufficiency Condition is given in **Annex XI c**.

4.3.14 Migration Pattern

41. Temporary migration takes place towards Jhapa, Birtamode, various part of India and abroad.

4.3.15 Settlement and Market

42. Major settlements within Zol are Gherabari, Bhagudubba bazaar, Rajgad, Chakchaki, Pholbari, Ghailabudda, Laxmipur, Bhangbari, Madanpur, Sisne, Sadhutar. Housing pattern of these settlements is mostly clustered type. Some of the houses in main markets have rented shops in the ground floor and are used as residential purposes for upper floors. This type of commercial cum residential buildings is seen in dense form at the Laxmipur and Rajgad market area. The agricultural land adjacent to the main roads of these areas has been turning into residential and commercial plots.

4.3.16 Potential for Development

43. The potential of the Subproject area are as mentioned in Table 4.7 below.

Table 4.6: Development Potentialities in Various Sectors

SN	Sector	Development potentiality
1	Agriculture	Vegetable and fruit farming, rice production, dairy production, within the whole Zol
2	Small and Cottage Industry	Bamboo products, furniture, tea industry, dairy industry within the whole Zol
3	Trade and business	Development several rural market centres at various places along the road alignment and main market centres at Rajgad, Chakchaki, Pholbari, Ghailabudda, Laxmipur and Madanpur.

Source: Field Survey, November 2009

4.2.17 Religious, Cultural and Historical Sites

44. There are no significant sites of religious, cultural and historical importance in the Zol.

5. PROJECT ALTERNATIVES

45. Assessment on alternatives of the Subproject is discussed as in the following subsections.

5.1 No Action Option

46. This alternative assesses the consequences if the Proposal is not implemented. The gravel road currently exists, which is operable in all weather. The road connects a remote and poverty ridden area with high potential in dairy, vegetable, fruit, tea productions. People have been selling the products to the markets of Laxmipur and Rajgad Bazar. However, travel time and cost is high due to not good condition of the existing road. Upgrading of the road will decrease the cost as well as provide better access facility with enhanced opportunity for development of the area without any additional significant adverse impacts. The no action option may avoid environmental impacts, but only at the cost of poverty and underdevelopment of the area. Development is must for attaining poverty reduction goal of the government, and access facility is the basic infrastructure that facilitates overall development. Thus, this option is not relevant for the Proposal.

5.2 Proposal Alternatives

47. Construction of other supporting roads could be the options for achieving the transportation and access. Considering other project alternatives, the proposed road project can be the best option to serve the purpose of efficient transportation requirement as well as this road links with east west National Highway and it will be alternative route of Sadhutar-Birtamod-Korobari road to reach Korobari.

5.3 Alternative Alignment

48. The alignment of the road is an existing motorable and fair weather with 6m to 9m width. Since this is an existing road, the proposed rehabilitation measures do not need to acquire additional land and clearing of trees. Hence, new alternative alignment is not feasible and the proposed existing alignment can be the best option.

5.4 Alternative Design and Construction Approach

49. The proposed road has been designed considering combination of both the RBG and Contractor based approach (Premix carpeting, earth excavation, side drain, cross drainage structures, bio-engineering gabion structures etc).

5.5 Alternative Schedule

50. The construction period is more appropriate from October to June due to dry weather, and then the people are generally free from farming activities.

5.6 Alternative Resources

51. Stones, boulders, aggregates and sand has to be transported from Biring river. The proposed construction will optimally use the local labour force and local materials.

6. IDENTIFICATION AND EVALUATION OF IMPACTS, BENEFIT AUGMENTATION AND MITIGATION MEASURES

52. The identification and assessment of impacts has been carried out by considering the proposed proposal activities examined in terms of its current condition and likely impacts during construction and subsequent operation phases. The impacts have been predicted in terms of their nature, magnitude, extent and duration. The possible impacts (positive and negative) in construction and operation phases are presented in the following sub-sections. Beneficial impacts maximization and adverse impacts mitigation measures are also suggested hereunder (see Table 7.2 in Chapter 7).

6.1. Beneficial Impacts and Benefit Augmentation Measures

6.1.1 Construction Stage

Employment Generation and Increase in Income

53. *Impacts:* Employment opportunity for local people during construction of the road, without gender biasness, is 109312 person days, with 22360 for skilled and 86952 for unskilled labor. Efforts will be made to employ more than 40% women workers. The amount of money earned as wages will directly support various economic activities of the people, and assist to empower women and indigenous people. It will assist towards enterprise development with multiplier effect if wage is used for economic investments. This is one of the direct and significant impacts of the project but it is of short-term and local in nature.

54. *Measures:* Work will be implemented manually through the local Road Building Groups (RBGs). Priority for employment will be given to local poor, dalit, vulnerable groups and women. They will be given training to do the job. Proponent will implement skill training, awareness, and income generation programs encouraging them to utilize their money earned through wage.

Skill Enhancement

55. *Impacts:* Working in construction of the road is likely to enhance skills of local people in construction works. Trainings on construction and maintenance of structures will further enhance their skill. The skill and knowledge thus acquired will make them find employment opportunities in future projects. This impact is indirect, medium, local and long-term.

56. *Measures:* Members of the Road Building Group will be given training on masonry, netting wires and construction of gabion wall, slope cutting, bioengineering works along with Agricultural, Micro enterprises, life skill, Capacity building training as listed in Social Action Plan.

Enterprise Development and Business Promotion

57. *Impacts:* During construction period, different types of commercial activities like daily commodities will come into operation in order to meet the demand of workers. Since they will have good purchasing power, they will regularly demand for different types of food, beverage and other daily necessary items. Local shops and restaurants will be opened to meet these demands around the vicinity of the construction sites. Development of several rural market centers at Gherabari, Bhagudubba bazaar, Rajgad, Chakchaki, Pholbari, Ghailabudda, Laxmipur, Bhangbari, Madanpur. This impact is direct, low significance, local and short term.

58. *Measures:* Training in cooperatives, and promote use of local products by the construction crews.

Community Empowerment and Ownership

59. *Impacts:* During construction various road construction coordination committees and road building groups will be constituted in order to facilitate in implementation of the road. In this process, they will be oriented and trained to build and safeguard community infrastructures which will result in community empowerment and feeling of ownership. This impact is indirect, low, local and short term.

60. *Measures:* The coordination committees will be constituted and training will be given to them.

Women and Indigenous People Empowerment

IPDP plan???

61. *Impacts:* Women and indigenous people in particular may be benefited more from improved access to the market centers and various service providing agencies like health centers, banks, training institutes, women development office etc. Frequency of visit to such agencies will increase awareness level and empowerment. The impact will be indirect, significant, local and for long-term.

62. *Measures:* Assist to organize women groups, provide training and social mobilization, provide micro-finance and encourage cooperatives to undertake commercial scale farming activities.

6.1.2 Operation Stage

Improvement in Accessibility and Saving of Time and Transportation Cost

63. *Impacts:* Upgrading of road will enhance the access of people to social services, and quick transportation of goods. Once the road project is completed, the people living within the road corridor will have easy access to cities and markets. It will save more than 50% of travel time and transportation cost too. This impact is direct, high, regional and long term.

64. *Measures:* Proponent will undertake regular maintenance of the road.

Increase in Trade, Commerce and Development of Market

65. *Impact:* Improved access will increase economic activities and minor local markets like Gherabari, Bhagudubba bazaar, Rajgad, Chakchaki, Pholbari, Ghailabudda, Laxmipur, Bhangbari and Madanpur will grow. Productivity will increase due to cheaper transportation of agricultural inputs. Sale of farm and livestock products will increase in the bigger markets of Jhapa district. This will support the economy of rural area. The impact will be indirect, significant, local and long term in nature.

66. *Measures:* DDC/VDCs shall manage planned growth with required infrastructure facilities in the market areas. Agriculture extension services, market linkages and networking for better market price will be coordinated with district agriculture office.

Appreciation of Land Value

67. *Impacts:* Upgrading of road will lead to appreciation of land values by two times due to availability of reliable access facility. This will uplift the economy of local people. Financial institutions may accept their land as mortgage for lending. The impact is indirect, medium, local and for long term.

68. *Measures:* Promotion of land development activities and control of encroachment within RoW. Awareness program shall be organized on use of high value land to get bank loans for setting up enterprise ventures.

Enhancement of Community Development Services

69. *Impacts:* Improved access will contribute in improvement of social services in the area such as education, health, government offices, saving and credits. Improved access will facilitate stay of extension workers, teacher, and doctor to their rural duty areas. This is indirect, significant, regional and long-term impact of the proposed project.

70. *Measures:* The access will be kept maintained so that other services will follow in the area.

6. 2 Adverse Impacts and Mitigation Measures

6.2.1 Construction Stage

71. The proposed road will be constructed through Contractor and RBG where manual works are possible. The likely impacts on physical, biological, socio-economic and cultural resources of the proposed road area and respective mitigation measures are presented hereunder.

6.2.1.1 Physical Impacts

Change in Land Use

72. *Impacts:* The upgrading works of road formation, side drain and Bridge construction will be in existing RoW, therefore will not require additional land. The major component of the project is the earth filling necessary for road width widening and borrow pits for earth and gravel. The extraction of earth from

nearby areas will cause depression in the ground surface will result in water logging problems and soil erosion. Therefore, the impact on loss of agricultural land will be direct, low, short term and site specific.

73. *Measures:* Site selected for borrow pits must be lands where the effect will be temporary and generally involve lower value land and the sites shall be rehabilitated soon after use or compensation will be given to private land.

Slope Instability

74. *Impacts:* The road lies in terai plain area. Embankment erosion and toe cutting by river is main slope instability. Embankment erosion are at Ch 3+350, 9+350 and 12+900. The likely impact is direct, low, site specific and short term.

75. *Measures:* The mitigation measures will be re-vegetation of exposed areas; adoption of bio-engineering techniques (Grass plantation, Brush layering, and Bamboo/tree plantation). Recommended civil engineering structures and bioengineering measures necessary at various chainages for slope protection have been given in Annex XII.

Spoil Disposal

76. *Impacts:* Unmanaged disposal of spoil may cause gulling and erosion, block drainages, damage farm lands, crops, water loggings. The impact from spoil disposal will be direct, medium, site specific and short term in nature.

77. *Measures:* Spoil will be safely disposed and managed at designated site with minimum environmental damage. Engineer will give approval for disposal site of spoil. Spoil will be used to reclaim land or eroded areas. Disposal site will be provided with vegetation and adequate protection against erosion. Potential safe spoil management areas are given in Table 6.1.

Table 6.1: Potential Spoil Disposal Sites

S. No	Chainage	Location	Remarks
1	0+650	Gherabari	Berang Khola
2	12+950	Rajgad	Banyani khola
3	30+800	Arjundhara	Beringl khola

Source: Field survey, November 2009

Quarry/ Borrow Operation

78. *Impacts:* Disturbance in river regime, disturbance in natural drainage patterns, water logging and water pollution. The likely impact will be direct, medium in magnitude, site specific in extent and short term in duration.

79. *Measures:* The mitigation measures will be quarry and borrow operation plan will be prepared and approved by Engineer, fertile farm land will be avoided for quarry / borrow operation; quarry sites will be rehabilitated by providing appropriate civil engineering structures and bioengineering measures (Tree plantation, Bamboo plantation) after the extraction is complete. Recommended quarry sites in the area are given in Table 6.2.

Table 6.2: Recommended Quarry Sites

SN	Chainages	Places of recommended quarry sites
1.	43+700	Stone and sand quarry from Bering Khola river.

Source: Field Survey, November 2009

Air, Noise and Water Pollution

80. *Impacts:* Although the air quality of the project area is not measured, the air does not appear to be polluted. Dust will be major problem during the construction and operation of the road. Impact on air quality will be direct, low, local, reversible and for short term.

81. The project area at present does not experience higher levels of noise pollution. However, during construction, the increased construction activities may increase the noise level to some extent. The impact of road construction on the noise level will be direct, low, site specific, reversible and short term.

82. The water quality in the project area appears to be fairly clean and not polluted. During construction of Bridge these water bodies may be polluted by spoil and construction wastes. The impact will be direct, low, local, short term and reversible.

83. *Measures:* The mitigation measures will include use of face mask by the workers working in the areas of high dust generation; contractor will frequently sprinkle water during surfacing of the road; avoid disposal of excavated materials in the water bodies; cover dry material or make it wet during transportation. Black topped will reduce dust pollution. Plantation of 1000 no. of trees (Mango, Gulmohar and Kadam), which will act as sound and noise barrier.

Drainage Management

84. *Impacts:* River Crossing and Irrigation crossing may get blocked due to road construction. The irrigation canal at Ch 0+600, 3+470, 6+500, 7+300, and 8+600 crosses the road which will block during road construction. **The impact will be indirect, medium, site specific and medium term.**

85. *Measures:* The Construction materials will not be disposed on or near irrigation canal, provide adequate numbers of drainage structures in order to have minimum interference with natural drainage pattern of the area.

Location of Camp Sites and Storage Depots

86. *Impacts:* Contractor will establish camp if he bring labors from outside the area. Siting of camp may cause encroachment of agriculture land and alteration of drainage, solid waste and waste water problems. Impact will be direct, medium significance, site specific and short-term.

87. *Measures:* The mitigation measures will be use of local labors to avoid camp; rent local house instead of camp to keep labors; sitting camp away from productive lands areas; pay compensation for using private farm or lands for storage or camp. Appropriate camp sites have been observed at 27+000 near Laxmipur and 11+400 near Rajgad Bazaar.

Use of Bitumen

88. *Impacts:* Bitumen is required for black topping. Spillage of bitumen damage soil productivity and pollution. Accident will occur.

89. *Measures:* The following mitigation measures will be adopted

- Use kerosene for heating and strict prohibition to heat bitumen by using fuelwood.
- Appropriate storage of material.
- Use of appropriate safety gears to ensure safe health of workers such as masks, boot, gloves, hat.

Construction equipment vehicles

90. *Impacts:* The Machine Intensive Road Construction Approach will use machineries and tools (Rollers, tippers, spreader, water tanker etc.). The related negative impacts are increase in air pollution due to emission of smoke, increase in vibration due to vehicular movement. Impact will be direct, high significance, site specific and short-term.

91. *Measures:* The equipment/vehicles deployed for construction activities shall be regularly maintained. All the vehicles deployed for material movement shall be spill proof to the extent possible. Fencing for the equipments camp.

6.2.1.2 Biological Impacts

Loss or Degradation of Forests and Vegetation

92. *Impacts:* Road alignment does not pass through forest areas. There is no loss of any type of tree or vegetation during road construction.

93. *Measures:* However roadside tree plantation 1000 nos. will be done.

Impact on Wildlife Due To Loss of Habitat and Poaching

94. *Impacts and Measures:* The *proposed* area is not a significant habitat of wildlife and bird species. Hence there will be no impact on the wildlife. Aware to the labours.

6.2.1.3 Socio-economic Impacts

Loss or Degradation of Farm Land and Productivity

95. *Impacts:* The upgrading works of road formation and side drain construction will be in existing ROW, therefore will not require additional land and there is also not dismantle private and community properties. But dust *settling* on crop and vegetation will affect production. This impact is expected to be of low in magnitude, local in extent and short term in duration

96. *Measures:* Tree *plantation* will be done along the road to minimize dust pollution.

Impact on Community Infrastructure

97. *Impacts and Measures:* During construction, the increased construction activities may increase the noise level to some extent and affect the community structure. The impact of road construction on the noise level will be direct, low, site specific, reversible and short term.

Table 6.3: Impact on Community Infrastructure and Mitigation Measures

Infrastructure	Location	Impact	Mitigation Measure
Public Health Post	0+000	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
Berang Bridge	0+650	Embankment erosion	Bio-engineering for embankment protection.
Slab Culvert	5+341	Spoil material will block irrigation canal	Excess spoil material will not dispose.
Hulaki Sadak Crossing	10+600	Across the road	
Ghagra Bridge	12+967	Embankment erosion	Bio-engineering for embankment protection.
School	14+700	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
Chakchaki Secondary School	17+700	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
Ghailadubba High School	23+500	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
East-West Highway crossing	27+300	Across the road	No impact, Information Signboard.
Temple	27+400		Information signboard will be placed.
Secondary School	29+100	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
Bring khola Crossing	30+800	Embankment erosion	Bio-engineering for embankment protection
Secondary School	37+900	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
Health Post	42+600	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
Secondary School	42+700	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
Sadhutar Temple	43+700	Noise and dust pollution	Information signboard will be placed. Two rows roadside tree plantation will be done.
Access road	0+800, 1+500, 3+600, 7+100, 14+100 ---- -----	Level different	10 -15m access road will be done blacktopped, Cost is included in BoQ.

Source: Field Survey, November 2009

Health and Safety Matters

98. *Impacts:* During construction of both road and bridge, workers will be exposed to respiration and eye diseases due to exposure to dust, risk of accident during work, polluted drinking water, unhygienic sanitary facilities, hearing loss due to high level of noise. Increased contact between local and migrated workers can cause spread of serious health risks like STDs and HIV/AIDS. This impact is direct, high in magnitude, short term and local.

99. *Measures:* Make mandatory the use of helmets, safety belts, masks, gloves and boot by workers depending on nature of work; sprinkle water at high dust sites; provide clean drinking water at sites and camp; pit toilets at sites and camp; first aid facilities at sites and camp with training to use them; provide group accidental insurance for workers. Awareness generation to local people and workers on HIV AIDS and other communicable diseases. Safety measures (Helmets, boots, Gloves) will be used for bridge construction.

Impacts on Cultural, Religious and Archeological Sites

100. *Impacts:* There are no any cultural, religious and archeological sites along the road alignment.

6.2.2 Operation Stage

6.2.2.1 Physical Environment

Road Slope Stability and Management

101. *Impacts:* River flood, water logging and blockage of drains can lead to embankment erosion. Sensitive areas for possible soil erosion and instability problems Ch 3+350, 9+350 and 12+900. The impact will be direct, medium local and long term nature.

102. *Measures:* The mitigation measures to be adopted include clear drainages and embankment protection by civil structures and bio-engineering.

Impact Due to Air, Noise and Water Pollution

103. *Impacts:* Black topped will reduce dust pollution. As the road is of district road category and the vehicular movement is not expected to be very high. Thus, the impact will be direct, low, local and long term.

104. Noise during operation of road will increase. However, due to low traffic volume, the impact due to noise pollution will be direct, low, local and long term.

105. The disposal of spoil and household wastes, washing of vehicles in water bodies may degrade the water quality. The impact will be direct, low, local and long term.

106. *Measures:* Measures to be adopted will include plantation of trees on both sides of road as far as possible; restrict horn near forest, health posts, schools and settlements; provide speed limit for vehicle at sensitive areas.

6.2.2.2 Biological Environment

Disturbance to the Wildlife and Bird

107. *Impacts:* There are no significant habitats of wildlife in the Zol. Although illegal poaching of birds might occur.

108. *Measures:* Community and authorities will remain vigilant and alert on illegal killing of birds.

6.2.2.3 Socio-economic and Cultural Impacts

Unplanned New Settlement and Market Center Development

109. *Impacts:* Expansion of settlement area and market can be observed at Gherabari, Bhagudubba bazaar, Rajgad, Chakchaki, Pholbari, Ghailabudda, Laxmipur, Bhangbari and Madanpur . Encroachment of RoW may take place. This will reduce road capacity, increase road accidents, and adversely impact road. The impact will be direct, medium, local and long term.

110. *Measures:* The mitigation measures to be adopted include regulation of settlement with proper planning; plantations of trees in the RoW so that it will reduce encroachment; Authorities and VDCs will control encroachment of road.

Change in Social Behavior

111. *Impacts:* Access facilities may bring social nuisance like increase in alcohol consumption, gambling, prostitution, and may increase girl trafficking. The impact will be indirect, medium, local and long term in nature.

112. *Measures:* Support awareness raising programs and strengthen communities against such nuisances.

Road Safety Measures

113. *Impacts:* Movement of vehicles and inadequate road safety measures may invite accidents. The impact will be direct, medium, local and long term in nature.

114. *Measures:* The mitigation measures to be adopted will be applying appropriate road safety measures such as delineator post in high embankment and necessary safety signs will be used along the road.

7. ENVIRONMENTAL MANAGEMENT PLAN

115. The EMP is prepared to guide implementation of mitigation measures and monitoring requirements.

7.1 Institutions and Their Roles

Table 7.1: Concerned Institutions and Their Roles

Institution	Role	Responsibility in the Project	Remark
Ministry of Environment	Mandated to formulate and implement environmental policies, plans and programs at national level	Facilitate when needed on environmental safeguards	No direct responsibility in the project
Ministry of Local Development (MLD)	It is concerned line ministry, executive agency and concerned agency as per EPA/EPR. Environment Management Section is responsible to look into safeguard matters for the ministry.	<ul style="list-style-type: none"> To review IEE ToR and Report, and give approval. Coordinate with project on safeguard issues Conduct environmental monitoring from central level. 	Executing Agency
Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)	Department under MLD responsible to execute infrastructure projects under MLD. Provides back-up support to DDCs in technical matters through DTO.	RRRSDP is being executed under overall coordination and supervision of the Department for the Ministry. It is also supporting DDCs through DTOs to implement the project.	Executing Agency
RRRSDP- Project Coordination Unit	Project specific unit.	Technical Unit to support and coordinate all activities for implementation of RRRSDP. Review, comment, and forward IEE ToR and Report for review to ADB and for approval to MLD	First Class Officer / DDG of DoLIDAR has been heading the PCU.
District Development Committee / District Technical Office	DDC/DTO is Project Implementing Agency.	<ul style="list-style-type: none"> Prepare IEE ToR and submit for approval to PCU/MLD Conduct IEE Study, Public Consultation, and prepare IEE Report Receive comments from PCU/ADB/MLD and modify accordingly. Get final approval from MLD. Conduct environmental safeguard monitoring Reporting 	District Technical Officer is the Project Manager
District Project Office	Project implementation office working directly under DDC/DTO.	Responsible for overall activities related to implementation of the works at field level.	Implementing Agency
Central Implementation Support Consultant (CISC)	Support consultants at central level	Technical and management support to PCU	Consultant
District Implementation Support Team (DIST)	Support consultants at district level	Technical and management support to DPO	Consultant

116. To support for smooth implementation of the project, there are various district level committees and groups including District Project Coordination Committee (a sub-committee of DDC), Village Infrastructure Construction Coordination Committee (to coordinate at VDC level). Road Building Groups are formed under participation of local people from ZoI. They carryout the manual construction works. Contractor will be appointed for works requiring higher skill and mechanized support.

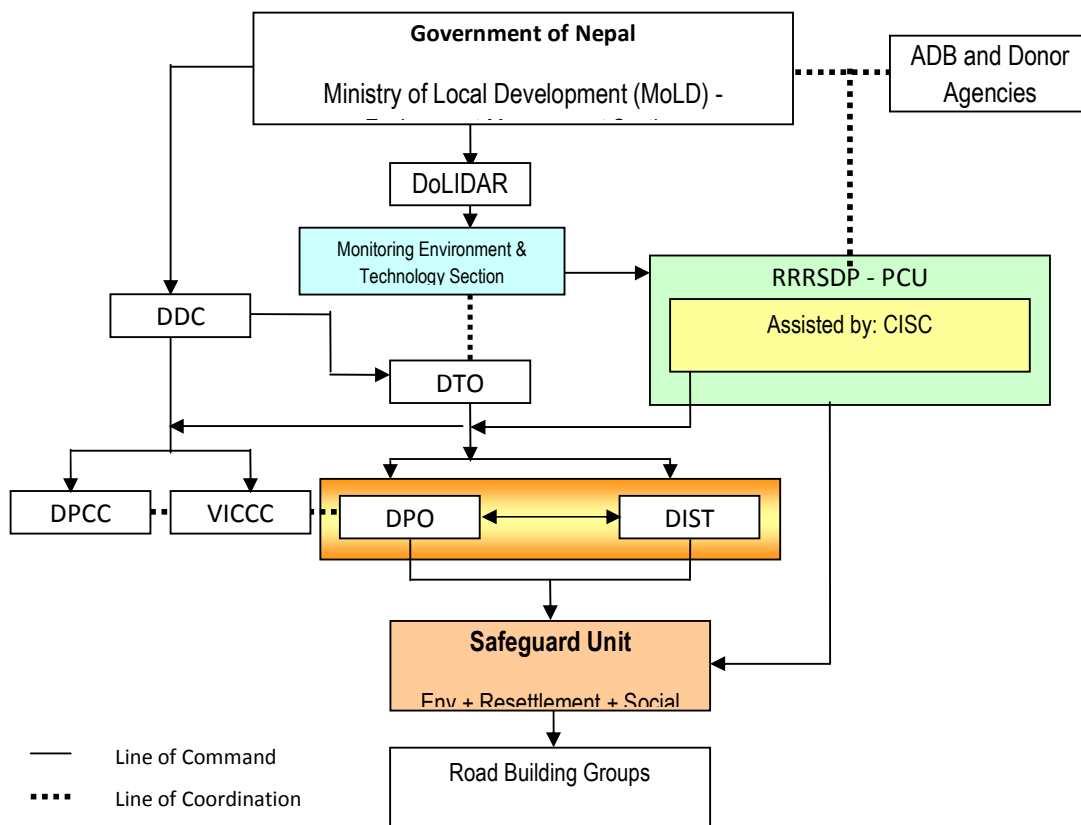
7.2 Reporting

117. Monitoring checklist will be developed as per the Environment Management Plan (EMP). The checklist will be used for regular monitoring. Trimersearly EMP compliance report will be prepared and submitted to the DDC, and DDC will forward it to PCU / DoLIDAR.

118. The monthly reports will be based on recurrent site inspections and will report on the effectiveness of the mitigation measures; the contractor's compliance with the environmental specifications; measures recommended in the events of non-compliance, and recommendations for any other corrective plan.

119. The trimester environment monitoring report will be submitted for the first year of operation of the road by the Proponent (DDC/DTO) to Executing Agency (PCU/DoLIDAR), who will forward the report to ADB and MoLD. This is to ensure that post project monitoring is also carried out at least for one year.

Fig. 7.1: Environmental Management Organization Structure



7.3 Benefit Augmentation and Mitigation Measures Implementation Strategy

120. The DDC/DTO with support of DPO/DIST at local level and PCU/CISC at central level will be responsible for conducting careful and routine monitoring of EMP compliance. Overall implementation of the EMP will be the responsibility of the Proponent. Framework for implementing environmental management plan is shown in Table 7.2.

Table 7.2: Beneficial Impacts and Proposed Enhancement Measures

Activity	Effect	Related Beneficial Impacts	Type of Impact *)				Benefit Augmentation Measures	Responsible Agencies		
			Nat	Mag	Ext	Dur		Executing Agency	Supporting Agency	
Construction Stage										
Construction of road	Employment Generation and Increase in Income	Increase in income level. Employment generation of Skilled-22360, unskilled 86952	D	H	L	ST	Maximize manual work through local, poor, vulnerable and women. Training in income generation and skill enhancement.	DDC/DTO/DIST	DPCC / VICCC / CISC/PCU	
Construction of road	Skill Enhancement	Increase in income generating activities, employment opportunities	IN	M	L	LT	Priority to Affected Peoples (APs) and vulnerable groups, job training on various constructions works.	DPO/DIST	DDC/DTO / CISC/PCU	
Construction of road	Enterprise Development and Business Promotion	Enhancement in local economy at Gherabari, Bhagudubba bazaar, Rajgad, Chakchaki, Pholbari, Ghailabudda, Laxmipur, Bhangbari, Madanpur area.	D	M	L	ST	Training in cooperatives, and promote use of local products by the construction crews.	Contractor/ RGB	DIST/ CISC/PCU	
Construction coordination committee and RGB program	Community Empowerment and Ownership	Increase in income and ownership.	IN	L	L	ST	Coordination committees will be constituted and training will be given to them.	DPO/DIST	DDC/DTO / CISC/PCU	
Operation of Road	Women and Indigenous People Enhancement	IPDP plan??	IN	H	L	LT	Assist to organize women's groups, provide training in enterprise development, organize cooperatives, provide micro-financing to undertake production of commercial products, provide market services.	VDC / DDC	VDC / DDC	
Operation Stage										
Operation of Road	Improvement in Accessibility and Saving of Time and Transportation Cost	Saving in travel time and travel cost It will save more than 50% of travel time and transportation cost	D	H	R	LT	Proper maintenance (regular, emergency) , continuation of bioengineering	DTO/DDC	DoLIDAR	
Operation of Road	Increase in Trade, Commerce and Development of Market centers	Shifts towards improved commercial agriculture and increase in non-agricultural occupation	IN	H	L	LT	Manage planned growth with required infrastructure facilities in the market areas. Agriculture extension services, market linkages and networking for better market price.	DPO	DDC/VDC	
Operation of Road	Appreciation of Land Value	Improvement in local economic condition	IN	M	L	LT	Promotion of land development activities and control of encroachment within RoW. Awareness program shall be organized on use of high value land to get bank loans for setting up enterprise ventures.	DDC/DPO	DDC/VDC	
Operation of Road	Enhancement of Community Development Services	Ease of access to social service and raise in quality service	IN	H	R	LT	Keep road maintained to ensure access facility that will attract development of other social services facilities	Local people, DDC, VDC	DDC, VDC	

Table 7.3: Adverse Impacts and Proposed Mitigation Measures

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure		
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency	
Construction Stage											
Physical Environment											
Construction of Road, site clearance	Change in land use	The extraction of earth from nearby areas will cause depression in the ground surface will result in water logging problems and soil erosion	D	L	SS	ST	IR	Site selected for borrow pits must be lands where the effect will be temporary and generally involve lower value land and the sites shall be rehabilitated soon after use. Compensation will be given to private land.	DDC/DTO	DIST	
Construction of Road, earth excavation	Spoil Disposal	Disruption of road, damage to farmland, water pollution etc.	D	M	SS	ST	Re	Proper site selection and management of spoil at designated areas approved by Engineer; provision of proper drainages, toe walls; Proposed spoil disposal sites are 0+650, 12+950 and 30+800.	DDC/DTO	DIST/VICCC/ VDC	
Site clearance, excavation	Slope Instability	Erosion and instability areas of concern are at Ch 3+350, 9+350 and 12+900	IN	L	SS	ST	Re	Bio-engineering application (Such as Grass plantation, Tree/Shrub plantation, Brush layering, Bamboo plantation.	DDC/DTO	DIST	
Construction of Road	Water Management, generation of large volume of surface runoff	Erosion, landslide, damage to farmland	IN	M	SS	MT	Re	Proper drainage structures and proper spoil disposal, Avoid blockage or diversion of river and natural channels due to construction of road ,bridge and disposal of spoils.	DDC/DTO	DIST	
Construction works, operation of construction vehicles, material hauling and unloading etc. Earthwork, spoil and waste disposal.	Air pollution due to dust from exposed surface, from construction equipments and vehicles	Affect on local people and workers health and affect on agriculture.	D	L	L	ST	Re	Use of face mask while working on dust prone areas, covering of dust sources. Black topped will reduce dust pollution.	DDC/DTO / RBGs	DIST	
	Noise pollution	Disturbance and annoyance around school, health posts, forest areas.	D	L	L	ST	Re	Restrict horn near school, health posts, settlement; cover material during transportation.	DDC/DTO / Contractor	DIST	
	Water pollution due to sediment level, spills and leakage of oils and chemicals to water bodies	Risk of water borne diseases	D	L	L	ST	Re	Proper spoil management, and prevention of leakage and spills of construction chemicals, restriction in urination and defecation in open areas	DDC/DTO/ Contractor/R BGs	DIST/VICCC	
Construction of road	Quarry/borrow operation and its potential effect on instability, landslide	Change in river regime, instability, land slide; damage to farmland and property; water pollution	D	M	SS	ST	Re	Proper selection and management of quarry sites, rehabilitation of quarry/borrow sites after completion of work. Recommended quarry sites are 43+700.	DDC/DTO/ Contractor/R BGs	PCU/CISC/DIST/ VICCC	
Construction of road	Location of Camp Sites, Storage Depots	Encroachment of agriculture land, solid waste, and waste water may cause pollution	D	M	SS	ST	Re	Locate camp site away from productive land (potential sites at 27+000 and 11+400, use local labor and local houses as camp; pay compensation to land owner of camp area; proper storage of chemical and materials.	DPO assisted by DIST/ Contractor	DIST/VICCC	

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
Construction of road	Use of Bitumen	Damage in soil productivity, air pollution due to heating of bitumen, accident	D	M	L	ST	IR	Use kerosene for heating and strict prohibition on firewood uses, safety gears to workers (Such as gloves, boots, masks etc), appropriate storage of materials	DPO assisted by DIST/ Contractor	DIST/CISC/PCU
Operation of construction equipments	Construction machineries and tools (Rollers, tippers, spreader, water tanker etc.)	Air pollution due to emission of smoke, increase in vibration and noise pollution	D	H	SS	ST	Re	Equipment/vehicles deployed for construction activities shall be regularly maintained. All the vehicles deployed for material movement shall be spill proof to the extent possible.	DPO assisted by DIST/ Contractor	DIST/CISC/PCU
Biological Environment										
Construction activity	Loss or Degradation of Forests and Vegetation	Loss of biodiversity and valuable species of wildlife	IN	L	L	ST	Re	Roadside tree plantation 1000 nos. will be done.	DDC/DTO/DFO	DFO/CFUGs/DIST
Construction activity	Impact on Wildlife Due To Loss of Habitat and Poaching	The proposed area is not a significant habitat of wildlife and bird species. Hence there will be no impact on the wildlife	IN	L	L	ST	Re	Aware to the labours.	DDC/DTO/DFO	DFO/CFUGs/DIST
Social-economic Environment										
Acquisition of land for maintaining road width*	Loss or Degradation of Farm Land and Productivity	Dust settling on crop and vegetation will affect production	D	L	L	ST	IR	Tree plantation will be done along the road to minimize dust pollution.	DDC/DTO	CDC DIST/MICCC
Construction of road	Impact on Community Infrastructure (see table 6.3)	Air pollution and Noise pollution during the construction of road. River Crossing and Irrigation canal may get blockage due to disposal of spoil materials and construction activities.	D	L	SS	ST	Re	Information signboard will be placed (Such as Health post, School Area, Speed limit), Use of horns should be restricted. Removal of spoil and construction materials from river crossing and irrigation canal. (Specific measure is given in Table 6.3	DDC/DTO	PCU DIST/CISC/MICCC/DC
Construction of road	Health and safety matters	Injury, fatal accidents, outbreak of epidemics and diseases, decline in capacity to work	D	H	L	ST	IR	Occupational health and safety regulations, first aid facility at sites with health treatment arrangements, contingency planning; Proper drinking water and toilet facility for construction crew	DDC/DTO / Contractors	DIST/CISC
Operation Stage										
Physical Environment										
Quarrying, operation of construction equipments	Road Slope Instability	Embankment erosion, disturbance to traffic flow, pollution of water bodies, impacts on agriculture land	D	M	L	LT	Re	Clear drainages and embankment protection by civil structures and bio-engineering	DDC/DTON/DC	DoLIDAR , DFO, District Watershed and Soil

* Activities that will be carried out during pre-construction period

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
										Conservation Office (DWSSC)
Operation of vehicles, Inadequate drainage	Air, Noise and Water Pollution	Disturbance to students, patients, wildlife, effect to nearby agriculture land and crops. Black topped will reduce dust pollution.	D	L	L	LT	Re	Speed limit for vehicles, no horn signs, use vegetation barrier; Regular maintenance of drainage.	DDC/DTO	DoLIDAR/Local administration
Biological Environment										
Road operation	Disturbance to the Wildlife and Illegal Poaching	There are no significant habitats of wildlife in the Zol. Although illegal poaching of birds might occur.	IN	L	L	LT	IR	Community and authorities will remain vigilant and alert on illegal killing of birds.	DTO/ DFO	DDC/CDO / DFO
Social-economic Environment										
Easy Access by road operation	Unplanned New Settlement and Market Center Development	Encroachment of Row, increased accidents, delay in traffic movement, depletion of local resources, water pollution	D	M	L	LT	IR	Regulation of settlement with proper planning; plantations of trees in the RoW so that it will reduce encroachment; Authorities and VDCs will control encroachment of road	DDC/DTO	CDO / VICCC
Operation of Road	Change in Social behavior	Social and cultural conflicts	IN	M	L	LT	IR	Awareness, Enforcement of law and order	DTO	DDC/DoLIDAR
Operation of Road	Road Accidents	Increase in accidents	D	M	L	LT	IR	Appropriate road safety measures, Safety signs along the road.	DTO	DDC/DoLIDAR

* Legend Value in parenthesis is level of significance:

Nature- IN= Indirect; D= Direct

Magnitude- L= Low; M= Medium; H= High;

Extent- SS= Site Specific; L= Local; R= Regional; N= National; CB=Cross-boundary

Duration- ST= Short Term; MT= Medium Term; LT= Long term

Re=Reversible; IR= Irreversible

7.4 Mitigation Cost

121. The estimated cost for benefit augmentation measures like awareness raising program, skill training, promotion of small scale industries, and income generation activities will be covered by the Community Empowerment Component and Livelihood Enhancement Skills Training (LEST) program of the RRRSDP. Costs for income generation and awareness program activities for Affected Persons (APs) are included in Social Action Plan. The design and cost estimate for most of the suggested mitigation measures such as slope stabilization, quarry site management, spoil disposal, supply of safety gears, accidental insurance of RBGs, bio-engineering measures, tree plantation will be incorporated in the project cost. Therefore, most of the mitigation measures suggested would be a part of main project cost. All proposed mitigation measures will be integrated in the project design so that these measures may automatically form part of the construction and operational phases of the project. The indicative cost for environmental enhancement and mitigation is presented in the **Table 7.4**.

Table 7.6: Cost Estimate for Environmental Enhancement and Mitigation Measures

SN.	Environmental Protection Measures	Estimated Budget (NRs.)	Remarks
1. Benefits Augmentation Measures			
1.1	Training to DDC/DTO/DPO/DIST to conduct environmental monitoring and reporting	50,000	To be included in project cost
1.2	Training to Contractor/ Leader of RBGs	50,000	To be included in project cost
1.3	Enhancement in Technical Skills (Bio-engineering)	50,000	To be included in project cost
	Sub-Total (1)	150,000.00	
2. Adverse Impacts Mitigation Measures			
2.1	Bio-engineering work /Road Side tree plantation	347,959.50	To be included in BoQ
2.2	Insurance	1,000,000.00	To be included in BoQ
2.3	Construction of access Road, reinstate of affected infrastructures, stockpiling etc.	2,000,000.00	To be included in Project cost
2.4	Social cost	200,000.00	To be included in Social plan, project cost
2.5	Occupational health and safety, Information signboard	500000.00	To be included in Project cost
	Sub-Total (2)	4047959.5	
	Total	4197959.5	

7.5 Implementation of Mitigation Measures

122. The mitigation measures will be integrated into project design and tender documents so that the mitigation measures will automatically become part of the project implementation and operation. Mitigation measures will be included as separate items in the Bill of Quantities, and monitoring will be done based on these. The Proponent and the contractor will be bound by the parameters identified in the IEE Report and specific mitigation measures spelled in the contract. The final acceptance of the completed works will not occur until all the environmental clauses have been satisfactorily implemented.

123. The contract agreement document will explicitly mention the penalizing action to be taken against failure to comply with EMP requirements.

7.6 Environmental Monitoring

7.6.1 Monitoring Responsibility

124. The Proponent will develop in-built monitoring mechanism to safeguard environment during construction and operation stages. The DPO will be supported by DIST in the district, and PCU will be supported by CISC at center to ensure effective monitoring and undertaking corrective actions, as required. A Safeguard Unit will be established in DPO. The social, resettlement and environment specialists / officers from DPO/DIST will work in cooperation under the Safeguard Unit. They will undertake Subproject level monitoring under supervision and coordination of Specialists from PCU/CISC.

125. MoLD/DoLIDAR will be responsible for central level monitoring of EMP compliance. A provision of NRs. 50,000 will be allocated for the periodic monitoring by the center.

126. The Safeguard Unit at Subproject level shall submit monthly monitoring report to the PCU, who will forward a copy to ADB, NRM. Total cost of environmental monitoring (field visits, observation, review of reports and report preparation), excluding the cost of personnel, is estimated at NRs.200,000.00 as given in Table 7.7.

Table 7.7: Environmental Monitoring Cost

S. No.	Detail	Unit	Quantity	Rate	Total (NRs.)
1	Environmental Management Specialist	Man-month			Included in the Cost of DIST
2	Sociologist / Public Relation Expert	Man-month			Included in the Cost of DIST
3	Report preparation		LS		50,000.00
5	Transportation		LS		50,000.00
6	Cost for Monitoring by MoLD/DoLIDAR		LS		100,000.00
	TOTAL				200,000.00

Thus, total environmental monitoring and management cost is NRs. 4397959.50.

7.6.2 Types of Monitoring and Monitoring Parameters

127. Monitoring is an on going component of the environmental assessment process and subsequent environmental management and mitigation activities. There are basically three types of monitoring: baseline monitoring, Compliance Monitoring and Impact Monitoring. Environmental Monitoring for this sub project are:

- Compliance Monitoring – that verifies whether the EMP provisions are properly implemented in the field. The framework for compliance monitoring is given in the Table 7.8.
- Impact Monitoring - that confirms the result of implementing mitigation measures. The framework for impact monitoring is given in the Table 7.9.

Table 7.8: Compliance Monitoring for Sadhutar-Madanpur-Laxmipur-Gherabari Road Construction Works

Parameters/Issues	Responsible Implementing Agency	Verifiable Indicators	Verification Methods	Schedule	Responsible Monitoring Agency
Final alignment selection as per IEE /EMP recommendation	DPO / DIST	Alignment incurs minimum requirements to acquire land from agri. land, and minimum nos. of trees to clear.	Look the alignment on topo map with land use resources; verify it by walkthrough along final road alignment	preconstruction phase	PCU / CISC; DoLIDAR
Land and property acquisition and compensation Voluntary land acquisition	Proponent with assistance of DIST	Cadastral records, Land and properties acquisition procedures; Procedures followed during voluntary donation of Land; Preparation of inventory of structures likely to be affected Payment of compensation	Public consultation, photos; geo-referencing; Check inventory against cadastral records and discuss with land owners Check record of pending compensation	pre-construction phase before construction begins	CFC / PCU (CISC) / DOLIDAR / MoLD
Compliance to Environmental Protection Measures, including pollution prevention, water and soil management, slope stabilisation, cut and fill, waste management, spoils, sensitive habitats and critical sites, protection of fauna and flora	Contractor /RBG	Arrangement specified in the Code of Practice and in Manuals relating to environmental protection; EMP detail in IEE Document; records and observations on pollution, waste management, spoil deposit. Protection of wildlife and sensitive habitats and Use of fuel wood for heating and cooking.	Site inspection; Discussion with local people; Records; Photos; Sampling and laboratory tests.	During construction period and include in monthly report	DPO / DIST at district center and PCU/CISC at center
Protect environment from air & noise pollution	Contractor / RBGs	Dust level and noise level at work sites, major settlements and sensitive spots like health centres and schools; Crusher operated during night	Visual observation, Observation of good construction practices and discussion with residents and workers; DIST to measure air/noise level at sensitive spots.	Once in a month during construction measurement once during peak construction	DPO / DIST at district center and PCU/CISC at center
Protect water bodies from pollution	Contractor RBG DPO / DIST	Visual observation, observation of open defecation and pit toilets at work sites/waste management/spoil disposal around water sources.	Site inspection.	Observation once in a month during construction; Upon demand for testing with field kit	DPO / DIST at district center and PCU/CISC at center
Use of local labour, particularly vulnerable groups and women	DPCC / VICCC / RBGs Contractor	Percentage of employment of local labour, especially vulnerable groups and women and their wage rate.	Verification from records	During the entire period where labour work is contracted	DPO / DIST at district center and PCU/CISC at center

Parameters/Issues	Responsible Implementing Agency	Verifiable Indicators	Verification Methods	Schedule	Responsible Monitoring Agency
Awareness and orientation training on road construction locally employed labourers	DPO / DIST	Training programmes for skill development, occupational safety and environmental protection associated with road construction works; employment generation skill	Training records, assess feedback from participants	Beginning of construction and during construction	DPO / DIST at district and PCU/CISC at center (DTO)
Compliance to occupational health and safety matters	DPO / DIST; Contractor (if involved)	Health and safety regulations, first aid and medical arrangements, contingency plan, number and type of safety equipments such as mask, helmet, glove, safety belt.	Spot checks at work sites, accident records, safety equipment at site; discussion with workers	throughout construction stage	DPO / DIST at district and PCU/CISC at center
Restoration, rehabilitation, reconstruction of all infrastructure services disrupted or damaged during the construction work	Contractor / RBG / DIST	Continued services by the facilities and functional public life	Site observation; Public Consultation Meetings	Once in 15 days during construction	DPO / DIST at district and PCU/CISC at center
Clean up and reinstatement of the construction sites (camps, quarries, borrow pits)	Contractor	Decommissioned sites indicate no adverse/residual environmental impacts, and are rehabilitated to the satisfaction of the supervisor and land owners	Site observation; Comparing photos; Consultation with land owners	At end of construction period	DPO / DIST at district and PCU/CISC at center

Table 7.9: Impact / Effect Monitoring for Sadhutar-Madanpur-Laxmipur-Gherabari Road Construction Works

Parameters /Issues	Verifiable Indicators	Verification Methods	Location	Schedule	Responsible Implementation and Monitoring Agency
Slope stability and erosion	Slope failures & their causes; Fresh gullies and erosion; Success/failure of bio-engineering solutions	Site observation, photos discussion with people and technicians	At landslide areas and sites where bio-engineering failed	Continuously during construction and operation	DIST during construction; Proponent / DPO / Soil Conservation Office during operation
Disposal of Spoils and construction wastes	Damage to agriculture land, blocked drainage, hazard to downhill residents and agricultural lands	Site observation and interviews, photos	At specific locations where such sites occur	During construction at monthly basis	DPO / DIST at district and PCU/CISC at center
Quarrying of construction materials	Erosion, changes in river regime, bank cutting, landslide due to quarrying on slope	Site observation, photos	Quarry site areas	During construction at monthly basis	DPO / DIST at district and PCU/CISC at center
Disruption of drainage system	Blocked drainage, water logging, slope cutting and erosion by water	Observation, photos	Site specific areas	During construction at rainy season	DPO / DIST at district and PCU/CISC at center
Water quality	Water borne disease; adverse impact on aquatic life	Record of disease, measurement of water sample using standard field kit; impact to fish in streams	Construction sites; local streams	During construction at quarterly basis	DPO / DIST at district and PCU/CISC at center
Air quality	Dust level increase	Discussion with people at sensitive locations	At construction sites and at sensitive spots (schools, health post, market and settlements)	During construction at dry season	DPO / DIST at district and PCU/CISC at center
Change in economy	Nos. of new houses built; shops opened; New enterprises by local people	Discussion with local people	Project Area	Yearly during construction phase	DPO / DIST at district and PCU/CISC at center
Occupational safety and hazard	Type and number of accident occurred during construction	Records and interview with laborers	Project Area	During construction	DPO / DIST at district and PCU/CISC at center
Social conflict and nuisance	No of social conflicts between project and people;	Observations, interview with local people	Project Area	During construction	DPO / DIST at district and PCU/CISC at center / VDC
Ribbon settlement	RoW encroachment	Records, observations	Project Area	During operation	DDC/CDO

8. CONCLUSION AND RECOMMENDATION

8.1 Conclusion

128. The IEE study of the proposed Sadhutar-Madanpur-Laxmipur-Gherabari Road Subproject does not pass through any environmentally sensitive area, and have minimal adverse impact associated with loss of agricultural land. Most of the adverse impacts predicted are of low significance and short term as well as reversible. The rehabilitated road will provide better access to market and social services, and is expected to enhance productivity and improving quality of life of the people. Local people will get direct employment opportunity as workers during construction works, which will contribute in improving their income. The beneficial impacts from the implementation of the proposed road are more significant and long term in nature against the adverse impacts most of which could be avoided or minimized or compensated.

129. The IEE has shown that none of the anticipated environmental impacts of constructing the proposed road is significant enough to need a detailed follow-up EIA study. Therefore, this IEE is sufficient for approval of the Subproject.

8.2 Recommendation

130. The Subproject does not require acquisition of any private properties, public infrastructures or agricultural land. There are no forest areas along the road alignment and not any government/private trees need to be cut down during road construction.

131. The proposed road project is recommended for implementation with incorporation of mitigation measures and environmental management plan.

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ANNEXES

Annex I :Terms of Reference



नेपाल सरकार
स्थानीय विकास मन्त्रालय
जिल्ला विकास समितिको कार्यालय
जिल्ला प्राविधिक कार्यालय
ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना
जिल्ला आयोजना कार्यालय
भद्रपुर, झापा

०२३-४५६२७३


पत्र संख्या :- ०६६/६७
चलानी नं. :- १६

मिति :- २०६६/०५/३०

विषय :- TOR पठाइएको सम्बन्धमा ।

श्री ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना
आयोजना समन्वय ईकाइ
जावलाखेल, ललितपुर




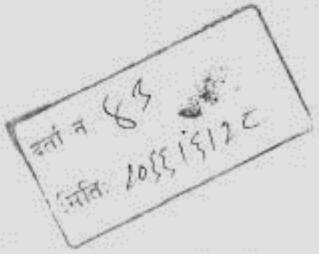
उपरोक्त सम्बन्धमा ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना (Rural Reconstruction and Rehabilitation Sector Development Program) अन्तरगत यस जिल्लामा छनौट भएका तपसिलमा उल्लेख गरीएवमोजिका ग्रामीण सडकहरुको प्रारम्भिक बातावरणीय परिक्षण (IEE) गर्नको लागि तयार गरिएको Term of Reference (TOR) यसै पत्र साथ स्वीकृतिको लागि पठाईएको व्यहोरा अनुरोध छ ।


शम्भु कार्की
आयोजना प्रमुख

तपसिल

१. सुरुङ्गा-शर्णामती-टाघनडुब्बा-डिगल बैक सडक ।
२. साधुटार-मदनपुर-लक्ष्मीपुर-घेरावारी सडक ।
३. दुधे-शिवगञ्ज-महाभारा-कुञ्जिवारी-कोरोवारी-वीरपुर-वगाह चौधरी सडक ।

Letter of Approval from MLD and Detail TOR for IEE

	<p>नेपाल सरकार स्थानीय विकास मन्त्रालय स्थानीय पूर्वाधार विकास तथा कृषि सडक विभाग (डोलीडार) ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना आयोजना समन्वय इकाई</p> <p>एकान्तकुना, जाउलाखेल ललितपुर</p>
च.मं.- ४००	मिति: २०६६।६।२८
<p><u>विषय: प्रारम्भिक वातावरणीय परीक्षण (IEE) को स्वीकृत कार्यसूची (ToR) पठाईएको बारे ।</u></p>	
<p>श्री जिल्ला प्राविधिक कार्यालय ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना जिल्ला आयोजना कार्यालय भापा ।</p>	
<p>उपर्युक्त सम्बन्धमा त्यस जिल्लामा निर्माण हुने दुधे-शिवगंज-महाभारा-कुन्जवारी-कोरोवारी-वीरपुर-बगाहा चौधरी सडक, सुरुङ्गा-शर्पामति-टाघनहुवा-डीगल बैक सडक तथा साधुटार-मदनपुर-लक्ष्मीपुर-घेरावारी सडकहरुको प्रारम्भिक वातावरणीय परीक्षण (IEE) को कार्यसूची (ToR) नेपाल सरकार (सचिवस्तर) को मिति २०६६।६।२२ को निर्णय अनुसार स्वीकृत भएकोले स्वीकृत ToR हरुको कपी (१, १ थान) यसैसाथ संलग्न गरी सो अनुसार आवश्यक कारवाहीको लागि अनुरोध छ ।</p>	
<p> (ई. जगन्नाथ तिवारी) वातावरण इन्जिनियर तथा तालिम संयोजक</p>	
<p>बोधार्थः श्री जिल्ला विकास समितिको कार्यालय, भापा ।</p>	
	
<p>फोन : ५५३६६९०, ५५३७०७४, ५५३६६९९, ५५३५१७३ (आयोजना संयोजक) फ्याक्स : ९७७-१-५५३९९९९, E-mail : rrrsd@dolidar.gov.np /info@rrr.gov.np, Website: www.rrr.gov.np</p>	

Annex II: Rapid Environmental Assessment (REA) Checklist

Rapid Environmental Assessment (REA) Checklist

Instructions:

- ☐ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- ☐ This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- ☐ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- ☐ Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

Country/Project Title: **Nepal/ Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP)**

Sub Project: **Sadhutar-Madanpur-Laxmipur-Gherabari Road Sub Project**

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the Project area adjacent to or within any of the following Environmentally sensitive areas?			
Cultural heritage site		✓	
Protected Area		✓	
Wetland		✓	
Mangrove		✓	
Estuarine		✓	
Buffer zone of protected area		✓	
Special area for protecting biodiversity		✓	
B. Potential Environmental Impacts			
Will the Project cause...			
Encroachment on historical/cultural areas; disfiguration of landscape by road embankments, Cuts, fills, and quarries?		✓	
Encroachment on precious ecology (e.g. sensitive or protected areas)?		✓	

SCREENING QUESTIONS	Yes	No	REMARKS
Alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	✓		
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker- aced camps and chemicals used in construction?		✓	
Increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?	✓		
Noise and vibration due to blasting and other civil works?	✓		
dislocation or involuntary resettlement of people		✓	
Other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		✓	
poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?		✓	
Creation of temporary breeding habitats for mosquito vectors of disease?		✓	
Dislocation and compulsory resettlement of people living in right-of-way?		✓	
Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials and loss of life?		✓	
Increased noise and air pollution resulting from traffic volume?		✓	
Increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?		✓	

Annex-III Abstract of Cost

Road:Sadhutar-Madanpur-Laxmipur-Gherabari Road Subproject
Rural Reconstruction & Rehabilitation Sector Development Program (RRRSDP)
Jhapa

S.N	Description of works	Unit	Quantity	Rate	Amount(NRs)
A.	<u>General</u>				
1	Insurance of works, Plants and materials, construction equipments and against accident to workmen including third party insurance.(GCC 13)	Ps	1.00	1000000.00	1000000.00
2	Carry out Laboratory testing of material and quality control tests as per requirement of site , specification and Engineers istration(SP 5)	PS	1.00	100000.00	100000.00
3	Provide Double Cap Four Wheel Drive Pick-up Vehicle (capacity2500 cc) on hire basis to the Project for the supervision of works By DPO/DIST. The rate should include cost of fuel, lubricants maintenance , Insurance and driver all complete(G-16)	per-month	12.00	75000.00	900000.00
4	supply 4 (four)Motorbikes (135 CC) on hire basis for the site supervision of DIST /DPO, rate should include fuel, lubricants , insurance and maintainance complete.(G-18)	per-month	12.00	48000.00	576000.00
5	Provide and maintain Site Office including lodging facility for the Supervision Team for the contract period as per Engineer ' instruction(G-19)	per-month	12.00	15000.00	180000.00
	Sub-Total				2756000.00
B.	<u>Earth Works</u>				
6	Excavation in road way and Foundation including removal and satisfactory dispoal of all materials up to a lead of 50 m along the lead route this including handling, stacking or hauling(to sites of embankment construcion) of suitable cut materials as required and also disposal of unsuitable cut materials in specified manner. (Respective clause of specifications 2-1.2.2,2-1.8 and 2-1.9)				
	a) ordinary soil	Cum.	340.46	118.45	40327.49
	Sub-Total				40327.49
C.	<u>Sub-Grade</u>				
7	Providing and laying of Soil obtained from roadway excavation or borrow pits or other sources including transportation of the material from source to the site, spreading in layers, watering and compaction all complete as per specification for the certain portion of Shoulder as directed by Engineer ; (Respective clause of specifications 2-5)	Cum.	31573.79	309.81	9781875.88
8	Providing and laying of River Bed Material for the Formaton of embankment including compaction in layres not exceeding 150mm compacted depth,	Cum	37314.11	919.94	34326742.35

	watering and haulage , all complete as per specification and directed by engineer. (Activity no.9-05,Clause no. 909 -DoR)				
9	Scarifying existing granular road surface for carrying out the required operation necessary to complete the work.This includes handling,salvaging,stacking and disposing of scarified material upto lead of 100 m along the lead route.(Respective clause of specifications 2-5.7.6 and 2-5.4.3)	Sqm	10000.00	47.38	473800.00
	Sub-Total				44582418.23
D	<u>Sub-Base and Base</u>				
10	Providing,laying,spreading, watering, levelling and compaction of natural sand gravel subbase(15cm) grading as per table 12.1 of standard specification lead up to 10m.(Spc.Clause no. 1201-DoR)	Cum	10135.70	2366.08	23981877.06
11	Providing,laying,spreading, watering, levelling and compaction of base course(10 cm) including full compaction.(Respective clause of specifications 3-2)	Cum	6030.35	4507.95	27184516.28
	Sub-Total				51166393.34
E	<u>Bituminous Course</u>				
12	Providing and spraying bituminous prime coat MC30/MC70 including cleaning the road surface using wire,brushes,brooms etc.before applying prime coat(Spc.Clause no. 1301,1302-DoR)	Lit	57926.00	112.53	6518412.78
13	Providing,mixing,laying and compaction of premixed carpet 20 mm thick(Spc.Clause no. 1307,1308-DoR)	Cum.	1158.74	10668.65	12362191.50
14	Providing,mixing,laying and compaction of seal coat with fine river grits or coarse sand(Respective clause of specifications 4-5)	Sqm	57926	110.06	6375335.56
	Sub-Total				25255939.84
F	<u>Structure Works</u>				
15	Providing and placing of flat Brick Soling as mentioned in specification and directed by the Engineer for Hume pipe work(Activity no.14.03, Spec. clause no.1403-DoR)	Sqm	9.36	454.71	4256.09
16	Providing and placing Brick Masonry in 1:4 cement mortar all complete works as mentioned in specification and directed by the Engineer for Hume pipe work(Respective clause of specifications 7)	Cum.	7.79	13787.16	107401.98
17	Providing and Placing Concrete Class M 10 (1:3:6)as mentioned in specification and directed by the Engineer for Hume pipe work(Respective clause of specifications 11,A,a)	Cum.	1.87	8006.52	14972.19
18	Supply and lay granular material in the bedding of RCC pipes including watering and compaction all complete as mentioned in specification and directed by the Engineer (DoLIDAR SN-46, Clause-15-4)	Cum.	3.43	1153.74	3957.33
	Sub-Total				130587.59

G	<u>Gabion Masonary Work for Structure</u>				
19	Supply and place different size rockfilled gabion boxes of hexagonal mesh with heavy coated GI wires,Mesh Size 100*120 mm,mesh wire 10 SWG,selvage wire 7 SWG and binding wire 12 SWG.(Respective clause of specifications 17-1.4,17-5, 17-6)	Cum.	580.00	3043.13	1765015.40
H	<u>Miscellaneous Work</u>				
20	Supply & Install Standard sign board as per Instruction for project information.(SP 20-2)	No.	2.00	3000.00	6000.00
21	Supply & place 1 Km post as per DOR Standard.(SP 20-3)	No.	15	2635	39525.00
22	Supply & place 5 Km post as per DOR Standard.(SP 20-3)	No.	3	6800	20400.00
	Sub-Total				65925.00
I	<u>Dayworks</u>				
	Day works shall be executed only on the written instruction of the project manager:(SP G-15)				
30	Labour				
	Skilled labour	Hr.	600.00	42.50	25500.00
	Unskilled labour	Hr.	1200	25	30000.00
31	Equipments	Hr.	200	300	60000.00
32	Materials	Cum	169.41	885	149997.31
	Sub-Total				265497.31
	Sub Total- 1 (NRs.)				126028104.20
	VAT @ 13% of Sub Total-1				16383653.55
	Provision for Contingencies @ 5% of Sub-Total				6301405.21
	Grand Total				148713162.96
	Per Km Cost				7899349.99

A. GENERAL SOCIO-ECONOMIC SITUATION OF THE INFLUENCE AREA²

VDC	Name of Settlement	Household and Population	Caste/ethnic distribution	General Comment

2. Economic activities/main occupation

3. Existing services and infrastructures

[illegible]

S N	Service/Infrastructure Category	Settlement Code									
		A	B	C	D	E	F	G	H	I	
11.5	Others (specify)										

A. _____ B. _____ C. _____ D. _____ E. _____

F. _____ G. _____ H. _____ I. _____

4. Land holding pattern

Land holding	Settlement Code (HH No.)										Remarks
Pattern	A	B	C	D	E	F	G	H	I		
	()	()	()	()	()	()	()	()	()		
Landless											
less than 1 ropani											
1 to 5 ropani											
5 to 10 ropani											
10 to 20 ropani											
20-50 ropani											
> 50 ropani											

A. _____ B. _____ C. _____ D. _____ E. _____

F. _____ G. _____ H. _____ I. _____

5 Food grain availability

SN	VDC	Settlement	Number of HHs having food sufficiency for					Total HHs
			Surplus (Sufficient for > 12 months)	Sufficient for whole years	Sufficient for 6 months	Sufficient for 3 months	Hand to mouth existence	
1								
2								

Source:

3.4	Goat										
3.5	Sheep										
3.6	Rabbit										
3.7	Pig										
3.8	Fisheries										
3.9	Poultry										
3.10	Bee-keeping										
3.11	Others										

A. _____ B. _____ C. _____ D. _____ E. _____

F. _____ G. _____ H. _____ I. _____

7. Migration for employment

- (a) No. of HHs from where at least one person (may be HH head) is away from home for more than 6 months.

Settlement (No. of HH)									
A	B	C	D	E	F	G	H	I	J

- (b) Seasonal migration in search of work.

Month	No. of Total HH	Destination	Purpose

8. Dominant off-farm occupation in the settlement in descending order

B. DEVELOPMENT POTENTIAL ACCORDING TO SETTLEMENT

- B.1. Areas which have significant potential for development, for instance, high agricultural production, tourism development, local mines, etc. (indicate these areas in map/sketch).

S. N.	Name of Area	Description of Development Potential
-------	--------------	--------------------------------------

B.2. Scope of the proposed linkage in view of promoting socio-economic development (communication, agricultural production, education and health).

S. No.	Sectors to get direct benefit	Describe how it will benefit

B. Historic and Cultural Resources Within The Settlement

Type of Resource	Name/specification	Affecting activities	Location from project

Annex V: Public Notice

१० राजधानी
विहीनार, २९ असोज, २०७३

अर्थतन्त्र

प्रारम्भिक वातावरणीय परिक्षण (IEE) सम्बन्धी राय सुभाषका लागि सार्वजनिक सूचना

सूचना प्रकाशित मिति : २०७३/६/२८

ग्रामिण पुर्ननिर्माण तथा पुर्नस्थापना आयोजना (RRRSDP) अन्तर्गत एशियाली विकास बैंक (ADB) अन्तर्राष्ट्रिय विकास विभाग (DFID) स्वीस सरकार विकास नियोगको (SDC) अनुदान सहयोग ओफिडको (OFID) कर्ण सहयोग तथा नेपाल सरकार जिल्ला विकास समिति र आभारग्राही समेतको लगानीमा निर्माण गर्ने प्रस्ताव गरिएको सुरुङ्गा-सर्गासली-टाघनढुङ्गा-डिगल बैक सडक, साधुटार-मधनपुर-लक्ष्मीपुर-पेरावारी सडक, दुधे-शिवगञ्ज-महाभारा-कुन्जवारी-कोरोवारी-विरपुर-बगाहर्षीधरी सडक उपआयोजनाहरूको प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन कार्यान्वयन गर्ने सिलसिलामा वातावरण संरक्षण नियमावली २०५४ (पहिलो संशोधन २०५५ समेत) को नियम ७५(२) अनुसार यो सूचना प्रकाशित गरिएको छ ।

प्रस्तावकको नाम:- जिल्ला विकास समितिको कार्यालय / जिल्ला प्राविधिक कार्यालय / जिल्ला आयोजना कार्यालय भन्ना

प्रस्तावित सडक उपआयोजनाहरूको विवरण:-

क्र.सं.	सडकको नाम	प्रभाव पर्ने गा.वि.स. हरू	प्रस्तावको विवरण	लम्बाई
१.	सुरुङ्गा-सर्गासली-टाघनढुङ्गा-डिगल बैक सडक	सुरुङ्गा, सर्गासली, टाघनढुङ्गा, कुमरखोद	यो उपआयोजना सुरुङ्गा बजार देखि सुरुभई सर्गासली टाघनढुङ्गा, कुमरखोद हुने भागको सीमाना क्षिप्त बैक सम्म गई अन्त हुन्छ ।	२२.१३ कि.मि.
२.	साधुटार-मधनपुर-लक्ष्मीपुर-पेरावारी सडक	बहुलावारी, अर्जुनधारा, पैलाखुब्बा, झाँगीवारी, चकचकी, राजगड र पेरावारी	यो उपआयोजना साधुटारी गा.वि.स.को साठुवर बाट सुरु भई मदनपुर, लक्ष्मीपुर हुई पेरावारी गा.वि.स.भवन सम्म गई अन्त हुन्छ ।	४३.७६ कि.मि.
३.	दुधे-शिवगञ्ज-महाभारा-कुन्जवारी-कोरोवारी-विरपुर-बगाहर्षीधरी सडक	सतासीधाम, शिवगञ्ज, पाँचगाछी, महाभारा, कोरोवारी	यो उपआयोजना सतासीधाम को दुधे बजार बाट सुरु भई शिवगञ्ज बजार, पाँचगाछी, कुन्जवारी, तुलाचन हुई कोरोवारी गा.वि.स.को बगाहा खीचरी सडक सम्म गई अन्त हुन्छ ।	३१.२५ कि.मि.

उक्त प्रस्तावको कार्यान्वयन बाट वातावरणमा पर्ने सक्ने प्रभावको बारेमा सम्बन्धित गा.वि.स., विद्यालय, स्वास्थ्य चौकी, वन उपभोक्ता समिति तथा अन्य सरोकार वाला व्यक्ति वा संस्थाले यो सूचना प्रकाशित भएको मितिले १५ (पन्ध्र) दिन भित्र निम्न ठेगानामा आफ्नो राय सुझाव पठाई सहयोग गरिदिनुहुन अनुरोध गरिन्छ ।

राय सुझाव पठाउने ठेगाना:-

जिल्ला विकास समितिको कार्यालय, भ्नापा टेलिफोन नं. ०२३-४५५१६५, फ्याक्स नं. ०२३-४५६३९४	जिल्ला प्राविधिक कार्यालय/जिल्ला आयोजना कार्यालय, भ्नापा टेलिफोन नं. ०२३-४५६३३९, ४५६२७३ फ्याक्स नं. ०२३-४५६३७३
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Annex VI: Deed of Enquiry (*Muchulka*)

Annex VII: Name of the Organizations

Name of the Organizations (notice pasted and deed of inquiry obtained)

SN	Name or Organization	Address
1	District Project Office	Bhadrapur, Jhapa
2	District Development Committee	Bhadrapur
3	Office of Village Development Committee, Gherabari	Gherabari
4	Office of Village Development Committee, Rajgad	Rajgad
5	Office of Village Development Committee, Chakchaki	Chakchaki
6	Office of Village Development Committee, Dangibari	Dangibari
7.	Office of Village Development Committee, Ghailadubba	Ghailadubba
8	Office of Village Development Committee, Arjundhara	Arjundhara
9	Office of Village Development Committee, Khudunabari	Khudunabari
10	District Forest Office, Jhapa	Jhapa

Source: Field Survey, November, 2009

Annex VIII: List of persons consulted

SN	Name	Organization	Remarks
1	Bupal Bd Niroula	DDC	Ex LDO
2	Hemlal Aryal	DFO	DFO
3	Murlidhar Mishra	DADO	CADO
4	Lekhnath Pokhrel	DAO	Ass CDO
5	Prem Dahal	Surunga	memberDDC
6	Dewman Thebe	Kumarkhod VDC	Ex Chairman
7	Bhatai Chaudhary	Survey Office	Amin
8	Shamvu Karki	DTO	Chief DTO
9	Meghraj Pokhrel	NTC	
10	Durdrashan Baral	Ghailadubba	Users
11	Ganga Bhutrtel	Ghailadubba	Users
12	Dirga Br. Thapa	Ghailadubba	Users
13	Madan kumar Poudel	Gherabari	VDC Secretary
14	Narayan Singh Rajbansi	Gherabari	Member UCPN(Maoist)
15	Laxmi Yadav	Gherabari	Users
16	Basudev Bhattarai	Chakchaki	VDC Secretary
17	Subas C. Rajbansi	Chakchaki	Users
18	Chandra Adhakary	Chakchaki	Users
19	Umakanta Khanal	Arjundhara	Users
20	Ram Singh Subba	Arjundhara	Users
21	Kalala Jhapal	Arjundhara	Users
22	Motilal Rajbansi	Rajgad	Users
23	Moti Rajbansi	Rajgad	Users
24	Dipak Neupani	Rajgad	Users

Annex IX: Meeting minutes with local people

Annex XI

XI.a: Summary of public services & infrastructures

XI b: Land holding pattern of settlements within Zol

XI c. Number of households belonging to different food security category

XI d. Distribution of households by major occupation

Annex XI.a: Summary of public services & infrastructures

VDC Name	SCHOOL				HEALTH POST	AGRICULTURE /VETENARY OFFICE	POST OFFICE	BIOGAS	TELEPHONE FACILITY	FOREST OFFICE	SECURITY OFFICE	SHOPS	COOPERATIVES	FURNITURE	RICE MILL
	PRIMARY	LOWER SECONDARY	SECONDARY	HIGHER SECONDARY											
Gherabari	2	0	0	0	HP	1	1	356	1	1	1	63	1	5	4
Dangebari	0	0	0	1	PHP	0	1	243	1	0	1	143	6	2	7
Chakchaki	0	1	0	0	0	0	1	121	1	0	1	43	5	1	5
Arjundhara	0	0	1	0	0	0	1	34	1	0	1	54	0	1	1
Ghailadubba	1	0	0	0	0	0	1	23	1	0	1	24	0	2	1
khujunabari															
Rajghad															

PHP: Public Health Centre

SHP: Sub Health Post

HP: Health Post

Annec XI b: Land holding pattern of settlements within Zol

S. N.	Influenced VDCs	Ownership /land holdings						Total
		Distribution of HHs						
		Less than one ropani	1-5 ropani	5-10 ropani	10-20 ropani	20-50 ropani	More than 50 ropani	
1	Gherabari	120	60	50	62	99	32	423
2	Dangebari	106	50	45	50	80	22	353
3	Chakchaki	198	165	58	90	139	32	682
4	Arjundhara	214	227	203	204	91	18	957
5	Ghailadubba	428	190	90	117	130	42	997
6	khujunabari	71	319	254	206	50	7	907
7	Rajghad	348	181	120	133	112	49	943
Total		1485	1192	820	862	701	202	5262
Percentage		28.22	22.65	15.58	16.38	13.32	3.85	100

Annex XI c: Number of households belonging to different food security category

Sn	Influenced VDCs	Distribution of HHs by food sufficiency level				Total HHs
		0-3 months	3-6 months	6-9 months	9-12 months	
1	Gherabari	206	80	38	99	423
2	Dangebari	174	40	14	125	353
3	Chakchaki	320	43	51	268	682
4	Arjundhara	390	113	50	404	957
5	Ghailadubba	633	126	71	167	997
6	khujunabari	278	141	101	387	907
7	Rajghad	502	96	28	317	943
Total		2503	639	353	1767	5262
Percentage		47.56	12.14	6.72	33.58	100

Annex XId: Distribution of Population by major occupation

S. N.	VDCs	Agriculture labor	Employee	Business	Agriculture and Livestock raising	Abroad Labor	Others	Total Population
1	Gherabari	347	70	77	646	100	810	2100
2	Dangebari	442	53	70	477	193	582	1823
3	Chakchaki	580	109	141	918	233	1254	3266
4	Arjundhara	520	168	161	1852	372	1735	4825
5	Ghailadubba	575	241	348	1560	402	1893	5100
6	khujunabari	138	104	123	2008	339	1632	4451
7	Rajghad	651	87	412	1102	306	2183	4810
Total		3253	832	1332	8858	1945	9794	26375
Percentage		12.33	3.15	5.05	33.58	7.37	37.13	100

Annex XII: Detail Structure

Hume Pipe

Chainage	L(m)	Diameter(m)	Pipe Count	Remarks
4+573	7.5	0.6	2	Pipe Culvert
8+518.16	7.5	0.6	2	Pipe Culvert
8+540	7.5	0.6	2	Pipe Culvert
1+205.4	7.5	0.6	1	Pipe Culvert(Existing)
1+638.7	7.5	0.9	3	Pipe Culvert(Existing)

Bridge

Chainage	Span(M)	Remarks
30+800	70	Biring Bridge(Existing)
12+967	66	Ghagra Bridge(Existing)
0+650	70	Berang Bridge(Existing)

Slab Culvert

Chainage	Span	Remarks
5+341	6	Slab Culvert(Existing)

Annex XIII: Photograph



Berang Bridge at Ch 0+650



Wooden Wing wall of Bering Bridge Ch 0+650



Road alignment at Ch 0+700



Ghagra Bridge at Ch 12+967



Road alignment at ch 30+400



Road alignment at Ch 25+670



Road alignment at ch 35+500



Road alignment at ch 37+580