



CONSULTANCY REPORT

An Assessment of Nepal Rural Reconstruction and Rehabilitation Sector Development Programme (RRRSDP) Based on Integrated ECD Methodology

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Executive Summary

The Department for International Development (DFID) South Asia has developed an integrated environmental assessment screening checklist and methodology, known as the Environmental, Climate Change and Disaster Risk (ECD) Methodology, to conduct assessment of all productive programmes over the next three years. The DFID South Asia has decided to apply the integrated ECD methodology on the project/programme titled “Rural Reconstruction and Rehabilitation Sector Development Programme (RRRSDP)” which is currently being implemented in Nepal. The project is now jointly supported by ADB, DFID, OFID and SDC and implemented by the proponent The Department of Local Infrastructure Development and Agricultural Road (DOLIDAR).

RRRSDP will be implemented in 38 districts and will improve 859 km of rural road, construct 1319 metres of bridges, 735 supplementary infrastructure and 591 water supply schemes. The design has adopted best practice in its approach to ensure that investments decisions are made inclusively, project employment is pro-poor and implementing agencies are accountable to beneficiaries. The overall programme-outcomes will be greater inclusion, improved local governance, and accelerated delivery in rural infrastructure. The expected project-impacts will be improved connectivity of rural communities, enhanced economic and employment opportunities, and increased access for the poor and excluded to market and social services for rural communities.

The RRRSDP is divided into several sub-projects, each of which missed opportunity to integrate wider ECD issues in their respective environmental assessment processes. An application of the methodology on the project IEE report, the logical framework of the project, and on the environmental screening note (ESN report) prepared by DFID suggest that only immediate environmental issues have so far been considered, while the wider long-term environmental issues of climate change and disaster risk are not integrated in the project activities and design.

One may argue that the statutory requirements are correctly met, which do not suggest the inclusion of such long-term wider environmental issues. As such, the quality of currently available IEE reports is good and found to be in conformity with the legal mandate. However, each sub-project has been defined in such a fashion that it may easily avoid being subject to rigorous EIA process, the latter being inherently difficult to manage compared to IEE.

Since there is a paucity of climate change related data and analysis, especially at the scales applicable for the design of sub-projects, there exist uncertainties in relation to proper integration of long-term ECD concerns. The institutional capacity to deal with

climate change is also found to be rather inadequate. For non-climate disastrous events such as earth quake, the construction protocols (and guidelines) developed by relevant Indian Institutions are generally followed, irrespective of their location-specific ground realities.

The current processes for screening projects, approving IEEs and monitoring implementation of mitigation measures do not require an integration of wider ECD issues. This may only be approached through creating legal provisions and mandate in favour of such integration. Given that it is a time consuming process, the environmental institutions should continue advocacy towards changing legal mandate to integrate wider ECD issues.

Despite such limitations, it is found that there still exist opportunities to integrate the wider ECD concerns in the sub-projects, especially in the design and management of the sub-projects. A slight modification of the logical framework towards integration of such concerns could easily address long-term sustainability issues, given that the project has just been initiated. Similarly, the design of bridges and road alignments could be modified in view of future implications of climate change and disaster risks.

A good number of sub-projects are yet to be developed. In order to facilitate integration of climate change and disaster related concerns in future sub-projects, the IEE report format should be modified. Accordingly, it should be highlighted in the TOR for future IEE activities.

The provision created by the EPA to include full range of ECD concerns in the environmental assessment process may be applied. As a prerequisite to make integration of ECD mandatory, relevant Nepalese institutions must take measures to enhance human skills and capacities so that the personnel involved can facilitate integration of ECD concerns.

As a general improvement measure, the project should facilitate building awareness on wider and long-term environmental issues covering ECD aspects. Such gradual awareness raising amongst the Village Infrastructure Users' Group (VIUG) members would help incorporation of climate change and disaster risk issues in their self-help programmes.

As an immediate measure, the prevailing design criteria and alignments of the roads should be revisited in view of increased complexities put forward by climate change induced enhanced disaster risks. This may be coordinated by the PCU of RRRSDP with the Geo-environmental Division of the DOR. The professionals from the latter institution may be invited to provide training to engineers working at both central as well as district levels.

In view of the limited time allocation for the position of an environmentalist in each of the DIST, it may either be extended for the duration of the project (i.e., from 15 months to 48 months) or a position (of an environmentalist and/or climate change specialist) should be designated within the provision for Third Party involvement in future in M&E activities.

DFID, in coordination with other development partners in the joint venture, should organize a number of capacity building activities, however based on realistic needs assessments. One may envisage the following capacity building training being organized on an immediate basis:

- A professional training of designated personnel on climate change and disaster risk reduction in each of the 75 DDCs, in collaboration with MLD;
- A capacity building training of Environmental Associates at the central level (i.e., PCU and CISC) and environmentalists working in each DTO/DIST on climate change and disaster risks;
- Incorporation of climate change and disaster risk related issues in capacity building training designed for VIUG members followed by refresher courses;
- A training course on designing rural bridges, drainage structures, land slide prevention, etc. involving design engineers as trainees and experts of DOR as trainers.

A joint effort between professionals working at RRRSDP and DOR may be facilitated to revisit and adjust rural road and bridge design criteria and to incorporate new criteria towards designing such infrastructures.

Such immediate actions may be further strengthened by undertaking relatively longer term activities, especially those would support knowledge generation and dissemination in relation to climate change induced hazards and disasters.

The NAPA process should create room for (a) development of micro-scale climate scenarios, based on regional climate models; (b) extending such climate scenarios for undertaking vulnerability studies in relation to hydro-geophysical hazards and their socio-economic implications at the grassroots levels. Socio-economic contexts of vulnerability in view of changing climate realities may be studied by the application of participatory vulnerability assessment techniques.

To this end, a multi-institutional coordination framework needs to be explored involving national institutions such as the MOEST, the Climate Change Research Centre (CCRC, as proposed in the budget document), the DHM and other relevant agencies. The research efforts need to be tied with media for wider dissemination of information and knowledge. The proposed CCRC should be empowered and equipped to work as knowledge management centre on climate change issues.

Finally, the log-frame produced for the RRRSDP project did not mention climate change as a potential risk. The log-frame needs to be revisited and as deemed

necessary to incorporate concerns of IECDA, it may be revised. The wider ECD issues may still be highlighted in 'Assumption and Risk' column. The provisions created in the log-frame for capacity building should elaborate on specific needs to integrate ECD concerns, while the need for amending design criteria, as highlighted in the DFID ESN, should be further explored (under section 4 and 5, as well as in activities and milestones).

Table of Contents

Executive Summary	ii
Table of Contents	vi
ACRONYMS	viii
1. Introduction.....	1
1.1. Background.....	1
1.2. Scope of the assessment.....	1
1.3. Description of the RRRSDP project	1
1.4. Brief Methodology Followed by the Assessment	2
1.5. Organization of the Report	3
2. Disaster Risks in Nepal for Road Infrastructure	4
3. The ECD Methodology: An Overview	6
4. The RRRSDP and its Environmental Assessment Framework	7
4.1 Current Legal and Policy Environment for Environmental Assessment	7
4.2 Environment Assessment Policy and Provision.....	8
4.3 Environmental Screening Based on EPR.....	8
4.4 Environmental Statement Report (ESR).....	9
4.5 Potential Impacts and Mitigation Measures.....	10
4.6 Environmental Assessment, Review, Monitoring and Supervision	10
5 An ECD Analysis for RRRSDP in Nepal	13
5.1 Examining Technical and Institutional Capacity	13
5.2 Examining Programmatic Risk Management, Monitoring & Evaluation Performance	16
5.3 Examining Macro-level Issues: Economic & Social Policies and Financing 17	
5.4 Examining Opportunities for Future Action.....	19
6 General Recommendations and Way Forward	21
Integrated Assessment Summary Table For RRRSDP-Nepal	23
References.....	22

ACRONYMS

ADB	Asian Development Bank
CDO	Chief District Officer
DAO	District Administration Officer
DDC	District Development Centre
DFID	Department for International Development
DFO	District Forest Officer
DHM	Department of Hydrology and Meteorology
DRR	Disaster Risk Reduction
DWIDP	Department of Water Induced Disaster Prevention
EA	Environmental Assessment
ECD	Environment, Climate Change, and Disaster Risks
EMP	Environmental Management Plan
EPA	Environmental Protection Act
EPR	Environmental Protection Rules
ESN	Environmental Screening Note
ESR	Environmental Statement Report
GLOF	Glacial Lake Outburst Flood
GON	Government of Nepal
ICIMOD	International Centre for Integrated Mountain Development
IECDA	Integrated Environmental, Climate Change & Disaster Risk Assessment
LB	Local Bodies
LSGA	Local Self-Governance Act
LSGR	Local Self-Governance Regulation
MLD	Ministry of Local Development
MOEST	Ministry of Environment, Science and Technology
MoHA	Ministry of Home Affairs
MW	Mega Watt
NAPA	National Adaptation Plan of Action
NDRRS	National Disaster Risk Reduction Strategy
NGO	Non-government Organization
OFID	OPEC Fund for International Development
PAC	Practical Action Consultancy
PWD	Public Works Directive
ROW	Right of Way
RRRSDP	Rural Reconstruction Sector Development Programme/Project
SDC	Swiss Agency for Development and Cooperation
TOR	Terms of Reference
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
VDC	Village Development Centre

1. Introduction

1.1. Background

In the post-UNCED era, concerns regarding environmental harmony are generally integrated into development planning and implementation. While nations across the globe have all been involved in developing tools and modalities to integrated general environmental concerns, the advent of a new set of concerns related to global climate change and disaster risks put renewed emphasis towards further integration of wider and often long-term issues in development planning and practices. In a bid to accommodate wider environmental concerns such as climate change and disaster risks new toolkits are being proposed and practiced (Koudstaal & Ahmed, 2006; Klein *et al.*, 2007; Tanner *et al.*, 2007).

The Department for International Development (DFID) South Asia has developed an integrated environmental assessment screening checklist and methodology, known as the Environmental, Climate Change and Disaster Risk (ECD) Methodology, to conduct assessment of all productive programmes over the next three years. The goal of such an assessment is to demonstrate that stretching environmental sustainability measures have been incorporated into key DFID South Asia country programmes. As a part of testing such a checklist and the integrated ECD Assessment methodology, it is intended to apply on a number of projects throughout South Asia. The DFID South Asia has decided to apply the integrated ECD methodology on the project/programme titled “Rural Reconstruction and Rehabilitation Sector Development Programme (RRRSDP)” which is currently being implemented in Nepal.

To facilitate the task, a two-member Consultant Team has been commissioned by DFID South Asia (The TOR is in Annex-1). The task was given to Practical Action Consultants (PAC). DFID Nepal provided support to the PAC Team to complete the task. This draft report is the culmination of various activities and analysis undertaken by the PAC Team.

1.2. Scope of the assessment

The approach, objective and methodology for the application of the integrated ECD assessment methodology are provided in the TOR (Annex-1). The scope of the task is provided below:

1.3. Description of the RRRSDP project

Following the signing of the Peace Accord, the Government of Nepal (GON) drafted a Three Year Interim Plan covering the period mid-2007 to mid-2010 to provide tangible benefits to Nepalese rural population. Within the development framework a Rural Infrastructure Reconstruction and Rehabilitation Investment Plan was approved, with an overarching goal of poverty alleviation through the creation of improved market access and service delivery. As a response to the investment plan, the Asian Development Bank (ADB) and DFID initiated the design of the RRRSDP. Since the design of the programme, OPEC Fund for

International Development (OFID) and Swiss Agency for Development (SDC) came forward to co-finance in the joint effort.

RRRSDP has three components: firstly a US\$50M policy grant to assist GON complete policy and legal reforms in the three areas of inclusion, governance, and rural infrastructure development; secondly US\$16.9 M of institutional, implementation and capacity building support; and US\$89.9M of rural infrastructure investments (DFID, 2008). It is envisaged that RRRSDP would support the move towards a Sector Wide (i.e., Programme based) Approach (SWAp) for rural infrastructure development over the next few years by means of capacity building, policy reforms and design work.

RRRSDP is being implemented in 38 districts and will improve 859 km of rural road, construct 1319 metres of bridges, 735 supplementary infrastructure and 591 water supply schemes (ADB, 2007). The project design has adopted best practice in its approach to ensure that investments decisions are made inclusively, project employment is pro-poor and implementing agencies are accountable to beneficiaries. The project has been divided into a number of sub-projects.

The overall programme-outcomes will be greater inclusion, improved local governance, and accelerated delivery in rural infrastructure. The expected project-impacts will be improved connectivity of rural communities, enhanced economic and employment opportunities, and increased access to market and social services for rural communities. The expected project outputs are improved rural roads and community infrastructure, and improved income opportunities for the poor and excluded.

RRRSDP commenced from January 2008 for a period of 48 months to 31st December 2011. The total budget is \$106.8 million. DFID's contribution will be £10 million (approximately US\$ 20 million). Since inception, Initial Environmental Examination (IEE) reports are being prepared for each of the sub-projects. ADB has prepared IEE reports for three sub-projects, while respective proponents of such sub-projects (i.e., the District Development Committees, DDC) have been preparing sub-project specific IEE reports. A total of 5 IEE reports have so far been in the process of approval from the Ministry of Local Development (MLD). The RRRSDP central administration has been completing project related activities such as procurement, deployment of consultants, preparation of guidelines and training manuals, and conducting project-related capacity building training sessions on various issues.

1.4. Brief Methodology Followed by the Assessment

The quick assessment primarily applied the Integrated ECD Assessment Methodology (IECDA) developed by the DFID (DFID, 2009). The IECDA checklist, as presented in Annex-II, has been used for the assessment. The method began with scoping of the assessment, literature review, holding one-on-one interviews with key informants in the relevant organizations and agencies, conducting a stakeholders' roundtable discussion and questionnaire survey, and application of the IECDA Methodology.

Literature review: Available information on secondary sources on impacts of climate change on Nepal and on Environmental Assessment (EA) processes, practices and regulations have been collected and consulted.

One-on-one interviews: Such interviews involving experts and relevant officials of GON have been organized, which enabled to PAC Team to discuss issues concerning EA practices with special reference to road construction and maintenance activities in Nepal. Insights regarding shortcomings of current EA norms, practices and statutory requirements were drawn from such interviews. To further facilitate the process, group meetings were also held in order to optimize time (in view of such a short timeframe to produce the report). The names and designation of interviewees are placed in Annex-III.

Roundtable discussion and questionnaire survey: About 35 specialists and practitioners on EA processes in Nepal and on ECD issues were invited to take part in a roundtable discussion. About 22 participants turned up and took part in the discussion (Annex-IVa), who represented government agencies, academia, professionals, NGO workers and activists. They were exposed to current EA practices and the RRRSDP (project), given an overview of ECD issues in relation to rural road construction, and introduced to potential implications of climate change and disaster risks in Nepal (Annex-IVb, c, and d). The participants of the discussion were asked to comment on the applicability of the ECD methodology, and to share their views regarding integration of ECD concerns in EA practices. A survey involving a brief questionnaire (Annex-IVe) was conducted at the end of the discussion. The results of both the activities have been collated to form a stakeholders' general point of view in relation to the application of IECDA methodology and the checklist.

The results thus obtained formed the basis for the analysis towards the assessment. Due to paucity of time and prevailing political unrests outside Kathmandu, any attempt to have a grassroots stakeholders' consultation was aborted which remains a major limitation of the methodology described above. In view of the methodology, a workplan was developed (as presented in Annex-V).

1.5. Organization of the Report

Section-2 of this report briefly describes the implications of climate change in Nepal with a particular emphasis on transportation sector. An overview of the ECD toolkit and the IECDA Methodology is provided in Section-3. Section-4 provides the current policy and institutional regime in relation to environmental assessment procedures in road construction sector in Nepal. The Analysis of the Assessment exercise is elaborated in Section-5. The wider ECD issues which may still be integrated in the project activities are placed in Section-5. Section-6 provides a summary table of the integrated assessment, enabling the reader to have a birds' eye view of the findings. The Section-7 highlights recommendations and way forward for future actions. The assessment report is furnished by a list of bibliography consulted/used. An executive summary of the report is placed at the beginning of the report.

2. Disaster Risks in Nepal for Road Infrastructure

Nepal faces a number of disaster risks, both climate induced such as floods, moisture stress, glacial melting, extreme rainfall induced flash flood, etc. and non-climate driven phenomena such as earthquake and land slides. Sometimes, landslides occur due to excessive rainfall runoff in hilly terrains. Climate driven hazardous events have been occurring repeatedly with a likelihood of increasing frequency under climate change. However, earthquake is a much less frequent phenomenon in Nepal. Scientific information suggests that the Himalayan Mountainous terrain is susceptible to tectonic hazards and subsequent naturally occurring landslides. Landslide due to human intervention, especially in steep slopes is quite common.

Disaster risks due to climate induced phenomena are increasing. There is scientific evidence that Nepal's climate has been changing over the past few decades. Past climatic trends reveal that average temperature in Nepal is increasing at a high rate (Shrestha *et al.*, 1999). The warming seems to be consistent and continuous after the mid 1970s. The average warming in annual temperature between 1977 and 1994 was 0.06 °C/yr (Shrestha *et al.*, 1999). The warming is pronounced in the high altitude regions of Nepal such as the middle mountain and the high Himalaya, while the warming is significantly lower or even lacking in the terai and sivalik regions. Warming is found to be more pronounced in winter.

Rainfall is found to be increasing by 13mm per year, while the number of rainy days is decreasing by 0.8 days per year. Consequently, river flow is reportedly increasing at 1.48 m³/s per year, which is about 1.5 times higher than increased precipitation. Dahal (2006) inferred that high increases in summer river flow as a consequence of high summer temperatures may be attributed to fast glacial melt/retreat (Dahal, 2006). Nepal's mean annual precipitation is found to be increasing, as is the occurrence of intense rainfall (Regmi and Adhikary, 2007). The latter causes increased erosion of soils and banks, while triggering enhanced sedimentation and sand casting on fertile lands.

Communities of different parts of Nepal have already begun experiencing unusual changes in weather patterns. Recent studies suggest that weather-related extreme events such as excessive rainfall, longer drought periods, landslides and floods are increasing both in terms of magnitude and frequency (Regmi and Adhikary, 2007; Dahal, 2006). Changes in weather patterns have also brought good news and opportunities for some communities. For example, farmers of Mustang and Manang districts have noticed improved apple sizes in recent years. However, such gains may perhaps be outweighed by hardships faced by a large majority across Nepal. For example, Dahal (2005) noticed an increase in water leakage into traditional houses, which people perceived as due to new precipitation patterns.

Modelling outputs suggest that the monsoon peak rainfall runoff will increase, resulting into an increase in flow volume in rivers, while the diminishing rainfall in winter and pre-monsoon would aggravate drought (i.e., moisture stress) phenomenon. Published literature suggest that the most pressing risk for Nepal stems from the potential increase of climate-related disasters, particularly of Himalayan glacial lake outburst floods (GLOF). Geoscientists have

noted that, with glaciers retreating due to global warming, the number and volume of GLOF hazards is growing (Mool *et al.*, 2001; WWF, 2006). There is a growing body of evidences that the number of GLOFs are on the rise in Nepal. A UNEP/ICIMOD study found over 3,252 glaciers, 2,323 glacial lakes, and 20 potential GLOF sites in Nepal (UNEP, 2002).

Climate plays a large role in determining the feasibility of hydropower projects, and the potential change in precipitation and temperature is likely to affect runoff. This in turn affects the potential electricity generation from a hydropower plant. GLOFs can destroy installations and infrastructures such as bridges and hydro-power plants.

Since crop agriculture is highly dependent on the weather, any change in rainfall pattern is likely to have serious consequences for Nepal's agriculture. Winter and spring crops are likely to be the worst hit due to decreased precipitation from November to April. Rice yields would fall in the Western and Far Western Regions where a greater population of the poor live, threatening their food security.

Irrigation provides lifeline to Nepalese crop agriculture, especially in the Terai region. Nepal's 6,000 rivers generally feed irrigation systems, power grain mills, and supply drinking water for villages for thousands of miles downstream. Higher temperatures, increased evapotranspiration and decreased winter precipitation may bring about more droughts in Nepal. According to Shrestha (2003), runoff will initially increase as glaciers melt, then later decrease as deglaciation progresses. Many rivers may face highly variable flows with climate change. Dwindling runoff would severely impact irrigation and drinking water supply.

Climate change will add complications to the functioning and performance of road networks. Climate change induced increased peak-flow in monsoon might increase risks to prevailing water infrastructures such as bridges. Any mismatch between flow allowance and peak flow might put such structures in high risk, thereby risking disfunctioning of the network. An incident of GLOF would have significant adverse impacts on current road networks.

Higher flow volume in monsoon might also trigger additional risks of landslides, which in turn would adversely affect functioning of the road network. For rural roads, the impacts might be significantly less. However, frequent landslides would escalate cost of maintenance and monitoring. Diminishing rainfall in dry season might desiccate top soils with increased index of aridity. This in turn would trigger accumulation of additional dust particles on surface drainage systems (drains etc.). Information base on climate change is provided in Annex-VI.

Earthquake is another hazard of geological origin, which can have devastating implications on roads and bridges. Such a non-climate hazard can induce large scale debris-slide in mountain terrains, which can potentially destroy road networks, especially if fallen on bridges, and/or make it temporarily non-functional. The cost of restoration of road network following such a disaster can be very high. However, the frequency of occurrence of high intensity earth quake in Nepal is rather low.

3. The ECD Methodology: An Overview

The IECDA methodology (briefly the ECD Methodology) deals with three interlinked concepts, each of which either individually or in combination with other concepts shape up the long term sustainability of activities under a given development programme/project. The issues covered under the integrated concept are environment, climate change, and disaster risks. The objective of the application of the IECDA is to integrate these interlinked concepts and issues and examine whether the long-term sustainability of development initiatives is achieved. The full assessment framework is provided in Annex-II.

The primary difference between the application of EA approach and the IECDA approach is to evaluate projected risks within a long-term sustainability framework, enabling to avoid risks on investments and benefit streams from all known and probable hazards instead of considering immediate risks on environment as a consequence of project activities within the duration of the project. Instead of exploring whether project-related activities directly or indirectly causing environmental degradation, the IECDA methodology allows a few additional questions such as:

- Whether disaster risks (climate induced and non-climatic) will entirely and/or partially ruin the capital investment related to the project?
- Whether accrual of benefit streams and/or project effectiveness could potentially be diminished due to ECD (i.e., disaster risks)?
- Whether the project will provide an opportunity which might not be fully realized due to ECD (i.e., disaster risks)?
- Whether due to the implementation of the project any significant opportunity likely to arise out of the changed ECD realities may be forfeited/missed?

On the basis of available information in view of long-term sustainability objectives of a given project/programme, projects may be categorized in three classes:

Category-1: Are potentially significant risks and opportunities identified and are addressed in the design, safeguards and/or log-frame?

Category-2: Are potentially significant risks and opportunities missed by project related documents?

Category-3: When insufficient information is available about the project to establish if there are any potentially significant risks and further investigation is required to scope the issues.

As outlined in the Assessment Framework (Annex-II), the methodology deals with a set of questions for each of the project categories defined above. The less the extent of answers are known at the time of the IECDA analysis, the more rigorous the set of questions that need to be answered under the IECDA methodology in order to achieve long-term sustainability objectives of the project in question.

4. The RRRSDP and its Environmental Assessment Framework

As a prerequisite for an in depth ECD analysis of the RRRSDP project, the environmental assessment processes followed under the prevailing statutory requirement have been analysed. A brief description of the project is provided in section 1.3. The EA for the RRRSDP project is provided below.

4.1 Current Legal and Policy Environment for Environmental Assessment

Having a generic development objective, construction of roads and other infrastructure involve a large number of issues, especially when the project is implemented in hilly terrain, through forests, and requiring to encroach upon watersheds, etc. Therefore, the project seeks legal and policy guidance from a large number of regulatory as well as policy documents. A summary is provided below, in Table-1, while a more detailed information is placed in Annex-VII.

Table 1 Environmental Assessment Procedure of Sub-projects

SN	Legal and policy regime	Purpose
1.	Local Self-Governance Act (LSGA), 1999 and Local Self-Governance Regulation (LSGR), 1999	Decentralized development, involvement of local bodies (LBs)
2	Local Infrastructure Development Policy, 2004	Infrastructure development
3	The 3-Year Interim Plan	Planned development
4	Environment Protection Act (EPA), 1997 and Environment Protection Regulations (EPR) 1997	Legislative framework for environment
5	Land Acquisition Act, 1977 and Land Acquisition Regulations, 1963	Acquisition of land for development/ infrastructure
6	Forest Act, 1993, Forest Regulations, 1995	Management and development of forest resources
7	National Parks and Wildlife Conservation Act, 1973	Conservation, wildlife protection
8	Soil and Watershed Conservation Act, 1982; Watershed Conservation Rules, 1985	Soil and Watershed protection
9	Water Resources Act, 1992; and Water Resources Regulation, 1993	Maintain aquatic environment
10	Explosive Material Act, 1973	Guide safe construction in hills
11	Public Road Act, 1973	Construction and operation of roads

4.2 Environment Assessment Policy and Provision

EPA and EPR provide a basic legal framework for environmental appraisal and mitigation in Nepal. The provisions made on the other relevant acts mentioned above comply with the essence and mandate of EPA and EPR. National Environmental Impact Assessment Guidelines and some sectoral guidelines for roads and related infrastructure have also been prepared (DOR, 2003; DOLIDAR, 2004; DOLIDAR, 2007). The legal provisions for environmental issues are provided in further details in Annex-VIII.

As stated above, since the executing authority for the IEE and/or EIA studies serves as a proponent, the concerned district office (i.e., DDC or DTO) will serve as the proponent of the IEE studies under RRRSDP. Since resource persons may not be available for conducting the studies in these entities, the preparation of the environmental assessment reports could be outsourced to qualified consultants or professional experts. District Implementation Support Team (DIST) at each district serves this purpose in RRRSDP. The environmental assessment procedure in RRRSDP has been summarized in Table 2.

Table 2 Environmental Assessment (EA) Procedure of Sub-projects

S N	Activity	Responsibility		Outcome
		Main	Supporting	
1.	Rapid environmental screening for prioritization and selection of main sub-projects	DDC	DIST	Sub-project selected based on walkover survey report
2	Environmental screening to determine whether IEE or EIA or no formal EA is needed for selected sub-project/s.	DDC	DIST	Environmental Screening Document
3	Rapid Environmental Assessment according to ADB requirements	DIST	CISC/ Project Coordination Unit (PCU)	Completed Rapid Environmental Checklist
4	ToR preparation for IEE	DDC	DIST	ToR report
5	ToR approval	MLD	CISC/PCU	Approved ToR
6	Public Consultation	DDC	DIST	Written suggestions/opinions about possible impacts
7	IEE Report preparation	DDC	DIST	IEE report
8	IEE approval	MLD	CISC/PCU	Approved IEE report

4.3 Environmental Screening Based on EPR

EPR contains two schedules listing the type of sub-projects¹ requiring either an IEE or an EIA. All sub-projects emerging under the framework of RRRSDP or any other Program must be considered for conducting either an IEE, EIA, or no further environmental study.

¹ For purposes of this Assessment document, and in keeping with the RRRSDP focus, the term 'sub-projects' will be used to mean 'projects' that are referred to in the EPA and EPR.

- a. Schedule I lists sub-projects which are likely to have significant but easily identifiable adverse environmental impacts for which mitigation measures can be readily prescribed. Such sub-projects require an IEE.
- b. Schedule II lists sub-projects likely to have significant adverse environmental impacts and require full EIA and report.
- c. One criterion (*Section I, Schedule 1 of the EPR*) based on estimated cost indicates that any development projects, physical activities, or actions intended to change the land use which are not listed in Schedule 1 but estimated to be in the range of 50 to 250 million Nepali Rupees, need an IEE study. Similarly, projects not listed under Schedule 2 but estimated to cost more than 250 million Nepali Rupees need an EIA study (*Section m, Schedule 2 of EPR*). Based on this, projects which are not listed in Schedule 1 and 2 and have a cost less than 50 million Nepali Rupees can be considered as exempted from the environmental assessment.

Since the overall project is divided into smaller sub-projects, all road sub-projects in RRRSDP fall under the first cost criteria described above and hence require an IEE.

- d. Sensitive area criteria (*Schedule 2, EPR*) refers to areas which are categorized as environmentally sensitive (and any sub-projects located within such areas need an EIA study): historical, cultural and archaeological areas; national parks, wildlife reserves, wetlands and conservation areas; and areas containing sources of public water supply.

4.4 Environmental Statement Report (ESR)

For the sub-projects which have no significant impacts, such as the three sub-projects under RRRSDP, minor impacts during the implementation are only likely to arise during the construction phase. Since wider ECD issues are not considered in the environmental screening, as per the EPR and subsequent guidelines, and disaster risks are not integrated, no remedial measure has been incorporated in the ESR.

In absence of long-term potential risk perceptions and considering only minor impacts on immediate environment, RRRSDP has made provision to prepare and implement ESR for such sub-projects. The content of ESR includes, among other things, identification of environmental impacts (due to construction related activities only), alternative analysis, mitigation measures and cost involved, environmental action plan and monitoring criteria. The program also envisages to make use of ADB REA checklist for water supply sub-projects and suspension bridges.

CISC has also prepared a guideline for Rural Water Supply and Sanitation targeting the water supply and sanitation sub-projects to be constructed (RRSDP, 2009). The guideline provides detailed description of the process of sub-project selection, survey formats, social mapping, documents used to form the users committee and obtain an ownership of the sub-project. However, the guideline does not provide any preventive or curative measures to cope with the environmental or wider issues such as climate change or disaster risks.

The decision rule with respect to sub-project classification is simple: the stricter rule applies. That is, if ADB or partner's project classification system recommends a higher level of environmental assessment compared with that resulting from EPR screening, ADB's requirement applies. On the other hand, if the EPR screening of the sub-project gives a stricter requirement compared with ADB's, the former applies.

4.5 Potential Impacts and Mitigation Measures

EPR categorically provisions to describe the biological, physical, and economic, social and cultural impacts caused by the intervention. The analysis covers those environmental elements which are exposed or influenced by project related activities, primarily during the course of the project implementation. Impacts are analyzed based on a number of categories, and respective mitigation measures are suggested. Detailed information on such analysis is provided in Annex-IX. Intriguingly, no attempt has been made to highlight potential impacts of long term issues such as climate change or the impacts of disastrous events such as earthquake and/or land/debris slides. Therefore, the IEE reports have not suggested any mitigation measures against such issues/events.

4.6 Environmental Assessment, Review, Monitoring and Supervision

The RRRSDP has carried out five sample core sub-projects in five districts, spreading over five development regions of Nepal. The districts and the sample core sub-projects were selected as per the recommendations of the Ministry of Local Development (MLD). Annex-X provides a brief overview of environmental requirements of the five sub-projects, where IEEs are being completed by respective authorities/proponents.

Once the environmental assessment (EA) report is prepared (by DDC or DTO with assistance from DIST), MLD reviews the EA report to ensure the adequacy of the proposed EMP, if any, to manage the risks, and to ensure compliance with all applicable statutory environmental regulations and ADB's EA requirements. MLD must ensure public consultation and disclose outcomes in accordance with ADB's Public Communication Policy. Information relevant to a sub-project's environmental issues is also disclosed and consultation with sub-project affected people are done at the early stage of EA work so that the views of the affected people are taken into account in sub-project design.

RRRSDP has defined a generic procedure to prepare the Environmental Assessment Documents (EAD) for each of the recommended sub-projects. Sample IEEs have been conducted for selected subprojects. The concerned department within the MLD has been following the EPR requirements of the Government of Nepal (GON). No attempt has been

made to integrate wider ECD issues, or potential disaster risks. The only focus has been on minor environmental degradation caused during the construction phase of each sub-project.

Currently, there is no need to integrated concerns regarding climate change induced effects and disaster risks. Since the current EA processes and statutory requirements do not ask for any such integration, there is clearly no attempt to do so.

In addition to the generic lack of statutory requirements for ECD integration, there is also lack of general understanding regarding such issues. The Officials of RRRSDP categorically admitted that the risks associated with climate change were unheard of to a number them prior to the meeting with the IECDA Consultant Team. There is dearth of relevant data to facilitate research and understanding on such issues. The country clearly lacks in terms of human capacity to undertake research on such important aspects. Moreover, there is hardly any institutional coordination towards integrating such concerns. For example, RRRSDP never sought suggestions regarding the long-term viability of roads and bridges in case of a water-related disaster (such as a major flood or a GLOF) from the Department of Water-induced Disaster Prevention (DWIDP).

The various stages of the environmental process pertaining to EARP involve more than one government agency, different management levels within each agency, and various other parties, such as, project unit, contractor, local community bodies, and the people themselves. Table 3 identifies the common implementation mechanism that need to be undertaken to ensure successful implementation of the EA.

Table 3: EARP Implementation Mechanism for RRRSDP

S. No.	Mechanism	Responsibility
1	Defining policy directions for RRRSDP in light of the GON policies and legislation.	MLD, DOLI DAR
2	Drafting ToR for specific subproject	Concerned DDC
3	Assembling teams to conduct environmental assessments.	DDC, with support from DOLIDAR & PCU
4	Ensure internal coordination among different level of authorities within the government agency.	MLD, DOLIDAR, and DDC
5	Staying up-dated with regulations and developments pertaining to RRRSDP relevance.	DOLIDAR, DDC, PCU
6	Defining priorities for RRRSDP	DOLIDAR, DDC, PCU
7	Organizing public consultations and participatory processes to ensure environmental assessment obligation	DDC, PCU, Local NGOs
8	Develop methods and operational tools for environmental awareness at policy, program, and operations level.	DOLIDAR, DDC, PCU
9	Organizing training and information campaigns.	MLD, DOLIDAR, DDC, PCU

Monitoring is an important element of environmental management. To improve the implementation of mitigation measures, RRRSDP has envisaged undertaking the following activities during environmental monitoring: (i) determine indicators to be used, (ii) collect

important and relevant information, (iii) apply quantifiable criteria with respect to prescribed indicators, (iv) conduct objective analysis of the information collected, and (v) based on that analysis, recommend improved mitigation measures to implementing agencies.

RRRSDP focuses on the three types of monitoring: (i) Pre-Construction and Baseline Monitoring, (ii) Construction Phase Monitoring and (iii) Operational Phase Monitoring. Impact monitoring focuses on key indicators to assess whether the impacts have been accurately predicted, and whether the mitigation measures are sufficient and effective. However, wider issues concerning climate change and disaster risks are not covered in the monitoring mechanisms. No attempt has been made to modify sub-project design criteria in anticipation of increased disaster risks, despite general recognition that such integration could be useful.

Despite the lack in integration of wider ECD issues in EA and monitoring mechanism, one may identify opportunities for future integration. MLD has initiated a mechanism to strengthen institutional support to integrate climate change related concerns in its future activities (even beyond RRRSDP implementation). According to MLD sources² a personnel will soon be designated in each VDC to facilitate such an integration, especially the integration of concerns related to climate change. These personnel would require capacity building/enhancement, which may be provided through the training opportunities highlighted in the above table (item # 8 & 9).

DFID/ADB can easily take this opportunity and help the MLD and other institutions to develop their human resources with adequate analytical skills to tackle climate change and disaster risk reduction. If such a training course is offered to VDCs through the MLD before the implementation of the road construction related activities (which are yet to begin), not only certain risks related to climate change induced hazards such as flood and landslides may be avoided, the respective personnel would also continue to influence integration of wider ECD issues involved in the development process under these VDCs.

² The name of the interviewees who represented MLD is placed in Annex III.

5 An ECD Analysis for RRRSDP in Nepal

Examination of project related documents such as Initial Environmental Examination (IEE) reports, Environmental Screening Note (ESN) of DFID, the log-frame of the project (as presented in DFID project document: DFID, 2008), etc. revealed that the project’s environmental perspectives and short-term concerns have been well covered, though there has been little integration of longer term issues such as climate change and risks associated with (low-frequency, but high impact) disasters. Despite such limitations, the DFID ESN for the project clearly highlights climate change as an issue, which provides the rationale for classifying the project under Category-2, as described above (pls. see the Annex-II). Table-4 gives an overview of different project categories.

The ESN clearly states that “design of the infrastructure will consider the climate change as evidenced through rainfall pattern, occurrence of flooding events in glacier fed and other rivers”. While this statement clearly highlights the importance of climate change as involving potentially significant risks and opportunities, the absence of the same in other important documents also suggests that such risks and opportunities are missed by the project. This qualifies the RRRSDP as a case under category-2, which according to the IECDMA methodology, warrants further investigation “... to evaluate their significance and recommend mechanisms to achieve sustainable outcomes”. According to the IECDMA Methodology, issues highlighted under sections B, C and D (pls. see the Annex-VII) required a thorough examination.

Table 4: Classification of Environmental Assessment (ADB)

Category	Determination of the type of Environmental Assessment Needed
Category A	Projects with potential for significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.
Category B	Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. An IEE is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
Category C	Projects unlikely to have adverse environmental impacts. No EIA or IEE is needed although environmental implications are still reviewed.

5.1 Examining Technical and Institutional Capacity

Relevant secondary sources and the responses from the roundtable discussion clearly suggest that in Nepal, there exist policies to respond to environmental and disaster risks issues, while there exists large policy gaps in terms of dealing with climate change. People generally recognize the statutory requirements on EA processes. However, the stakeholders are also in agreement that the legal framework requires reforms to accommodate ECD concerns to make effective strides for achieving environmentally sustainable development.

Interestingly, the GON has been showing keen interest to formulate its National Disaster Risk Reduction Strategy (NDRRS), while it has recently been embarked on the formulation of National Adaptation Programme of Action (NAPA) in order to foster wider integration of concerns related to climate change and disaster risks. However, a nationally agreed framework to integrate all the three concerns simultaneously (i.e., Environment, Climate Change and Disaster Risk) is yet to be developed and made functional.

While such important initial steps are being contemplated towards a wider integration, there exist a good number of national institutions to implement guidelines provided by such instruments (legal provisions, policies, strategies, and plans). The Ministry of Environment, Science and Technology (MOEST) is the leading agency to steer the EA processes and ensures the endorsement and implementation of Environmental Impact Assessment (EIA) processes. The Ministry of Forest and Soil Conservation, through its technical arm, the Department of Forest, possesses a network of offices up to sub-District level to ensure that vegetations are well managed and protected.

The MOEST has a Division on Climate Change affairs, which currently has been instrumental to negotiate Nepal's position in international negotiation fora. The climatological data are generated and maintained by the Department of Hydrology and Meteorology (DHM), thereby providing a crucial input towards enhancing scientific understanding on climate change. In recent years, there has been a declaration by the GON to establish a Himalayan Climate Change Centre, to be located within the DHM to foster research on climate change related issues in Nepal.

On understanding disaster risks, the Department of Water Induced Disaster Prevention (DWIDP) provides analysis on water induced disasters (such as floods). National Disaster Rescue Committee (translated from Nepalese) provides relief and reconstruction services, especially following the occurrence of disastrous events. The Ministry of Home Affairs (MOHA) is the other policy making institution in relation to disaster risk reduction (DRR). Recently, efforts have been made to initiate mechanisms to ensure wider institutional coordination on DRR.

Despite such an array of national to regional level institutions, the current state of research appears to be largely inadequate, especially on climate change issues. Only a handful of research reports are available dealing with implications of climate change in Nepal, which provide mostly the macro-level pictures and lack micro-level assessments – the latter being crucial for responding to the climate related risks at project/sub-project scales. Similar to the state-run institutions for research, there exists little capacity to provide research based products on climate change and disaster related issues amongst non-governmental institutions. No major effort could be identified towards managing knowledge products in relation to ECD.

As presented above, the state-run institutions have clear mandates in relation to their specific roles and responsibilities. However, on environmental issues such roles are quite visible whereas similar roles and responsibilities are yet to make marks on issues related to

climate change. DWIDP does not deal with all types of disasters. The MOHA links its disaster related services only during post-disaster rehabilitation phases, mostly in terms of offering relief.

Climate change is rather a new issue in Nepal, concentrated mostly amongst NGOs and academics. The MOEST has initiated a wing to take care of climate change related issues. As it has been pointed out by the responsible official of climate change division, responding to climate change has just begun within the government system in Nepal. Perhaps, with the formulation and subsequent implementation of the NAPA, the issues regarding climate change will be widely integrated across sectors and institutions, which is likely to pave the way for wider integration of such issues.

It is also expected that through the process of the formulation of NAPA by means of a well-coordinated mechanism the major institutions towards fostering climate change concerns in regular (or business-as-usual) development processes would be greatly facilitated. Besides concerns related to climate change, there exists coordination mechanisms between major institutions and project partners when it comes to environmental management. The statutory requirements clearly ensure inter-agency coordination for EA practices, though such coordination in most cases are not effectively carried out.

For example, the RRRSDP project has been divided in a good number of sub-projects. Rural road construction by definition should not cause large-scale environmental degradation. However, the legal/regulatory framework has given a provision based on amount of money spent by each sub-project that allows each of the sub-projects to avert being subject to full EIA (Schedule-2 of EPA; MOL). Therefore, the proponent of RRRSDP could confine their EA activities by completing IEEs, which did not require endorsement from the MOEST, rather requiring endorsement from the line ministry, the Ministry of Local Development (MLD). Within the regulatory framework, the project could easily get the 'go ahead' nod and bypass any major environmental scrutiny and post-project commitments.

As it has been revealed by the stakeholders, there exists a substantial research gap that hinders any potential effort to integrate climate change and disaster risks issues in the EA processes. There have been a few efforts to enhance human capacity to undertake research and implement adaptation related projects. However, major such efforts are generally supply driven and not based on adequate need assessment. There is no formal course on climate change in any of the tertiary level institutions, whereas climate change has been widely regarded as a major issue. In contrast, environmental assessment courses are quite common, especially in technical and engineering institutions. There is discontent amongst stakeholders that the graduates having such EA courses are generally exposed to relevant issues superficially and the theoretical grinding hasn't been matched with thorough practical experiences. Therefore, EA professional skills are not adequately reflected in EIA reports, which is why there is a general tendency to modify the project as per provisions of the regulatory framework so that the latter does not force the proponent to carry out an EIA. A major nation-wide capacity building effort can facilitate judicious implementation of EA process in Nepal.

The issues of institutional capacity building/strengthening in relation to EA processes are not considered with high priority. While there are allegations from the regulatory authority (i.e., MOEST) that most of the EIA requirements are seldom met with due analysis and compliance with regulatory framework, there are allegations against the MOEST that they had made EIA requirements high enough to even slow down the development process. Since poor capacity amongst the practicing EIA professionals has been judged as the root cause of non-compliance with the regulatory regime, it appears obvious that the current institutional capacity would face steeper challenges if integrated assessment mechanisms are considered mandatory. The objective of integration of all the aspects of ECD into EA process can only be met if a major capacity building effort is initiated on a priority basis.

5.2 Examining Programmatic Risk Management, Monitoring and Evaluation Performance

In the RRRSDP, five IEE documents are currently being made available. The most advanced one involving a sub-project in Kavre (GON, 2008) completed IEE where the Environmental Management Plan (EMP) is formulated. The IEE is preceded by the environmental auditing. However, no effort has so far been made to integrate climate change and disaster risks (despite that the DFID ESN highlighting the concerns regarding climate change). To enable integration of the ECD issues, the current inadequacy regarding technical capacity to prepare an integrated risk and vulnerability assessment as well as a management plan and the capacity to implement the plan need to be addressed.

The issues regarding lack of adequate human capacity have been highlighted earlier. Even if personnel are recruited to do the job, there exists little commitment amongst the personnel. Addressing environmental issues, even on paper, is perceived by relevant personnel as regulatory requirement, not as a pre-requisite to address sustainability concerns. The personnel involved require moral boost towards performing their duties passionately, rather than somewhat mechanically. The rationale needs to be explained during capacity building training.

Moreover, the current provisions also appear to be unrealistic and inadequate. For example, in each District Technical Office (DTO), there is a provision for an environmentalist. The monitoring and evaluation (M&E) plan within the EMP clearly highlights the needs for continued monitoring after the completion of the major construction. The DFID ESN also pledges "... the implementation of the environmental plans will be monitored continually". However, in reality the position of the environmentalist in each DTO is found to be for only 12 to 15 months – totally inadequate to perform M&E duties beyond the design phase. RRRSDP clearly sub-divided activities into smaller sub-projects just to satisfy the statutory requirements for producing IEE instead of EIA. The tendency has been to avoid stringent environmental compliance procedure. These clearly suggest that the personnel involved do not want to address any major environmental concern in relation to rural roads.

Frustratingly, there exist major opportunities to meet the objectives of both the M&E and risk avoidance measures if the RRRSDP project was able to benefit from wider inter-institutional coordination, cross-learnings and opportunities created by the project itself. The log-frame (ADB, 2008) clearly highlights the opportunity to enhance the above. Despite the fact that the training sessions involving DDC/DTO personnel and local stakeholders did not cover wider environmental issues, opportunities still exist to accommodate ECD concerns in future training sessions (as highlighted in items 8 and 9 in Table-3).

The proponent of the project (i.e., Department of Local Infrastructure Development and Agricultural Road, DOLIDAR) could easily adopt good practices of the Department of Road (DOR), where the design criteria for roads and bridges have been adjusted (though arbitrarily) to accommodate concerns regarding climate change. While major bridges are built with adjusted 'freeboard' allowance in design criteria, the DOLIDAR has not yet adopted similar criteria in 'smaller bridges' along rural roads. Moreover, the successful bioengineering techniques and practices adopted by the DOR could also be replicated as appropriate by the RRRSDP. Professionals from DOR could be invited to various training sessions to enhance capacity of DTO and District Integrated Support (Consultant) Teams (DIST).

Similarly, there is a provision for capacity building of Village Infrastructure Users' Groups (VIUG) so that they can help themselves following project completion towards maintaining the rural roads and other infrastructures. In the training sessions involving VIUGs, as highlighted in the log-frame (DFID, 2008), local villagers could be given orientation on climate induced risks of disasters and the types of problems that might cause underperformance of the infrastructures. Such training sessions could be more effective if subsequent refresher courses were also designed in the following years.

One may extend the idea of capacity building in other areas/concerns as well. The O&M training on environment could easily be extended by incorporating all aspects of ECD. Similarly, the training of Water Supply and Sanitation Engineers could be further strengthened by the incorporation of issues that relate to potentially reduced water availability in natural streams under climate change. A training on slope stabilization, as per the technical guidance of the Geo-environmental and Social Division of the DOR (DOR, 2009), could easily be added to avoid future risks of landslides and/or to manage it with adequate technical know-how.

5.3 Examining Macro-level Issues: Economic and Social Policies and Financing

The Macro-scene in relation to ECD issues has been becoming increasingly favourable in recent times. For example, the most recent budget document clearly highlights the importance of climate change issues in relation to hazards such as floods. It states "... *arrangement will be made to forecast and disseminate the chances of catastrophic floods induced by heavy rain and ice lake explosion. A well-equipped climate change research*

centre will be established to carry out studies on the impacts of climate change in the development of water resources, hydroelectricity, agriculture and environment” (GON, 2008).

Despite such strong commitments, the current level of integration of climate change issues in development planning is rather weak. Intriguingly, there have been references in the Poverty Reduction Strategy Paper and the current 3-year development plan to offer social safety nets (SSN) following a disaster and other forms of SSN activities in the wake of disastrous events (such as School feeding programme in disaster affected areas, etc.). Taking notes on current realities, one may infer that gradually the micro policy regime has been becoming more flexible towards integration of climate and disaster risk issues.

In this regard, the institutional framework is also emerging. For example, there are Disaster Relief Committees in each District where the Chief District Officer is the designated person to Chair the Committee. Such Committees work closely with the MOHA and manage post-disaster relief and rehabilitation activities. The MLD has recently decided to designate at least one District level personnel to assume responsibility for climate change and disaster risks management in 75 hazard-prone districts and a few other municipalities (MLD, 2009).

In order to address climate change induced increased risks to buildings and other infrastructures in rural areas, the current building codes need to be reviewed. However, the current legal framework does not require such a revision. The legal provisions may require a revision in order to review the existing building code to accommodate ECD concerns.

The current planning process is also not responsive to concerns regarding climate change. If location specific vulnerability assessment could be advanced through micro-scale scenario generation and analyses involving hydro-geophysical parameters and realities, local adaptation plans could be formulated. Such plans could be integrated in local area development plans. Thus, climate sensitive development plans could be formulated and implemented with the involvement of relevant national agencies. To this end, a detailed scenario development effort needs to be completed, followed by a detailed analysis of hydro-geophysical complexities at different ecological settings of Nepal. Without rigorous analysis and scientific understanding of implications of climate change at micro-levels, proper vulnerability analysis and adaptation planning could not be completed. The project may benefit in future from the formulation of the Nepalese National Adaptation Programme for Action (NAPA), which will provide for climate change scenarios and enhanced understanding on climate change.

Meanwhile, efforts need to be made to enhance local level human capacity to facilitate adaptation planning at the grassroots levels. National institutions must also require human capacity building to integrate climate change adaptation issues in their sectoral development planning and implementation.

Financing for these additional activities will perhaps remain as a major challenge. In this regard, efforts (advocacy and lobbying) need to be done to highlight the needs for raising finance from local sources as much as possible, while simultaneous efforts should also be

continued at international negotiation tables to draw down adaptation finance earmarked for Least Developed Countries (LDC). Meanwhile, dialogues with development partners need to be maintained with specific action plans to draw resources from various sources in this regard. Donors such as DFID and ADB should create financial opportunities for Nepal to develop its knowledge base and human capacity in the shorter to medium run in order to integrate concerns regarding climate change and disaster risks with general environmental issues.

5.4 Examining Opportunities for Future Action

As a general improvement measure, the project should facilitate building awareness on wider and long-term environmental issues covering ECD aspects. Such gradual awareness raising amongst the VIUG members would help incorporation of climate change and disaster risk issues in their self-help programmes.

As an immediate measure, the prevailing design criteria and alignments of the roads should be revisited in view of increased complexities put forward by climate change induced enhanced disaster risks. This may be coordinated by the PCU of RRRSDP with the Geo-environmental Division of the DOR. The professionals from the latter institution may be invited to provide training to engineers working at both central as well as district levels (i.e., at PCU/CISC and DTO/DIST).

In view of the limited time allocation for the position of an environmentalist in each of the DIST, it may either be extended for the duration of the project (i.e., from 15 months to 48 months) or a position (of an environmentalist and/or climate change specialist) is designated within the provision for Third Party involvement in M&E activities. Their efforts should be brought under a coordination mechanism involving newly designated posts of climate change and disaster risk reduction specialist within each DDC (as decided by MLD).

DFID, in coordination with other development partners in the joint venture, could organize a number of capacity building activities, however based on realistic needs assessments. One may envisage the following:

- A professional training of designated personnel on climate change and disaster risk reduction in each of the 75 DDCs, in collaboration with MLD;
- A capacity building training of Environmental Associates at the central level (i.e., PCU and CISC) and environmentalists working in each DTO/DIST on climate change and disaster risks;
- Incorporation of climate change and disaster risk related issues in capacity building training designed for VIUG members followed by refresher courses;
- A training course on designing rural bridges, drainage structures, land slide prevention, etc. involving design engineers as trainees and experts of DOR as trainers.

A joint effort between professionals working at RRRSDP and DOR could be facilitated to revisit and adjust rural road and bridge design criteria and to incorporate new criteria towards designing such infrastructures.

Such immediate actions may be further strengthened by undertaking relatively longer term activities, especially those that would support knowledge generation and dissemination in relation to climate change induced hazards and disasters.

The NAPA process should create room for (a) development of micro-scale climate scenarios, based on regional climate models; (b) extending such climate scenarios for undertaking vulnerability studies in relation to hydro-geophysical hazards and their socio-economic implications at the grassroots levels. Socio-economic contexts of vulnerability in view of changing climate realities may be studied by the application of participatory vulnerability assessment techniques.

To this end, a multi-institutional coordination framework may be explored involving national institutions such as the MOEST, the Climate Change Research Centre (CCRC, as proposed in the budget document), the DHM and other relevant agencies. The research efforts need to be tied with media for wider dissemination of information and knowledge. The proposed CCRC should be empowered and equipped to work as knowledge management centre on climate change issues.

Finally, the log-frame produced for the RRRSDP project did not mention climate change as a potential risk. The log-frame needs to be revisited and as deemed necessary to incorporate concerns of IECDA, it may be revised. The provisions created in the log-frame for capacity building should elaborate on specific needs to integrate ECD concerns, while the need for amending design criteria, as highlighted in the DFID ESN, should be further explored.

6 General Recommendations and Way Forward

A review of three sample IEE reports namely: Kamidanda-Taldhunga Rural Road, Beni-Pahkapani Rural Road and Dudhejhari-Tikapur Rural Road, published on the ADB website indicated that the reports need improvement to better reflect the content of the issues and their elaboration in more meaningful way, and to incorporate the additional issues concerning ECD.

A section of salient features of the project should be mentioned in the main text and should include traffic count, traffic forecast, standard of pavement and design speed, project components and a list of administrative units through which the road passess.

The criteria (general or cost) as of which IEE study is triggered should also be mentioned and highlighted. Environmental screening of the project should include the type of the road under GoN classification and the screening as per EPR. A clear description of the zone of influence, right of way and the formation width of the road should be provided in the text of the report. The cost of the project and of mitigation measures and monitoring activities should also be provided in the text of the report.

A brief overview of the assumptions used in the design of the road (return period of the high flood, rainfall and norms and standards followed for the engineering design) should also be provided on the section description of the project.

RRRSDP has been designed so that its scope and costs remained low enough not to require an EIA study. The intention of the criteria selected for RRRSDP is to limit the complex issues involved in EA process. This left little room to accommodate more complex and uncertain issues related to the climate change and disaster risks, which in turn imposed a self-restriction not to benefit from inherent opportunities.

The current process of EA involves identification of impacts based on cause effect relationship i.e. impacts are the direct consequences of some interventions which otherwise may not have occurred. Nonetheless, the preamble of EPA provides a broad definition justifying the need of the legislation to maintain clean and healthy environment by minimising the adverse impacts likely to be caused from environmental degradation on human beings, wildlife, plants, nature and physical objects and to protect environment with proper use and management of natural resources.

EPA and EPR categorically mandate the proponents to look at biological, physical and social, economic and cultural impacts originated from the project intervention. It is not mentioned in the legislation that whether the impacts caused by the external agents such as climate change on sensitive receivers of the project area or the project components themselves. These need to be examined during the assessment process. Despite apparent absence of legal provision to integrate wider ECD issues in the EA process, it is indeed found in the EPR that states "... while approving the work schedule pursuant to sub-rule (1)

and (2), the concerned body or Ministry may make minor changes or revision in such work schedule as required citing the nature of the proposal” (Article 5.3). Therefore, there is still a room to include issues such as climate change and disaster risk reduction in the assessment processes.

Road alignments follow the river / stream courses in many cases. A guideline for providing a minimum clearance between the highest flood level and the road surface is essential. Similar guidelines for bridge clearance are also recommended.

The current assumptions made to derive the empirical equations and the single point estimates of the variables used in the engineering design, technical specifications and the design templates needs to be revisited to incorporate the climate change related issues. Instead of using design specifications of foreign origin, such specifications need to be developed with proper research, based on local terrain-specific realities. Inter-agency collaboration appears vital in this regard.

The project should revisit the design standards and the underlying assumptions during the design phase. However, the RRRSDP officials need a clear mandate and guidance to do that.

Bio-engineering is being used to mitigate the risks due to landslides and soil erosion in the road sector in Nepal. Climate change implications could also be there on the biodiversity, cropping patterns and the vegetation grown in a particular area. Thus the research should also investigate the implications of the climate change on the vegetation used for bio-engineering purpose.

Major changes on river hydrology in Nepal have been noticed. The pattern of debris flow has also been changed. Rivers are also overflowing in Terai areas and river beds have been raised significantly. However, there is little or no research on identifying the contribution of deforestation, abnormal rainfall or any other causes on these emerging issues.

The capacity and knowledge base of RRRSDP and other executing agencies needs to be enhanced to deal with emerging challenges of climate change adaptation and disaster risk reduction.

Integrated Assessment Summary Table For RRRSDP-Nepal

Sign.	Risk or opportunity	Description	Potential outcome	Recommendations	Cost
●	Water sustainability	Irrigation will use water, current availability of water resource is not known, change in water availability due to climate variability/change not known, institutional capacity is weak and relevant data is not available.	Community's resilience to drought will be significantly impaired. With insufficient water available, crops relying on irrigation could fail, access to drinking water could be affected... Potentially, the intervention will not only fail to meet its purpose but could increase poverty...	Additional project activities: Infrastructure-based... Capacity building/TA ... Data requirements: - availability of data - additional data needs... Additional guidance on assessment of sub-projects ... Consideration of water storage options...	££ ££ £
●	Disaster risk – drying up of springs	The current availability of drinking water from natural springs and water balance information is not known, no information on increasing water demand in future, institutional monitoring is weak and relevant data is not available.	Communities dependent on natural springs for the collection of drinking water will suffer, water supply in the long run will be uncertain. In case of drying up of springs and other natural sources, no alternative source of drinking water will be available. The infrastructure might not function in future with drying up of sources.	Capacity building on M&E Enhance monitoring capacity ... Search and maintain alternative source Promote justified use of water/conservation	££ £££ ££ ££
●	Disaster risk - flooding	With stronger monsoon, runoff flow will increase leading to increased flood susceptibility. Return period of high floods will decrease. High floods will tend to erode more while higher	If the design criteria of infrastructure (especially bridges) are not changed and freeboard allowance for additional flow is not increased, flood waters will tend to erode parts of	Infrastructure (bridge) redesigning / drainage enhancement measures Understanding on CC-floods/TA Database updating/ maintenance at DHM	££££ ££££ £££

		volume of water might increase flow of debris, resulting into further aggravation of floods.	infrastructure. Higher volumes of runoff might require additional surface drainage capacity.	Capacity building on M&E Facilitate surface runoff in roads	£ ££££
●	Disaster risk - GLOF	GLOF might put infrastructure at high risk. GLOF observation and forecast capacity is rather inadequate, infrastructure being placed in areas which are subject to GLOF risks. Little persuasion to discourage communities to stay along potential courses of GLOFs.	Sudden outbursts of glacial lakes might have devastating effects on infrastructure.	Infrastructure (bridge) redesigning / drainage enhancement measures Understanding & data generation on GLOFs/TA Database updating/ maintenance Capacity building on M&E	£££££ £££££ ££££ £
●	Rainfall-induced disaster risk – Land slide	Higher monsoon rainfall under climate change will aggravate higher levels of landslides. Little understanding is available, while monitoring is also rather inadequate.	Small scale land slides might not be a major issue for rural roads. However, frequent occurrence of landslides on rural roads will reduce effectiveness of affected roads. Slope stabilization would be necessary, while maintenance of affected roads would be costly.	Landslide protection measures Capacity building on M&E Enhance monitoring capacity ... Awareness raising to avoid residing in earthquake-prone areas (media campaign)	£££££ £ ££ £££

<p>Significance</p> <ul style="list-style-type: none"> ● Significant risk – will risk increasing vulnerability of communities (including value of and access to ecosystem services), programme achieving purpose, etc. Should be scaled accordingly (●high, ●medium, ●low significance) ● Neutral – unlikely to have significant impacts on vulnerability of communities via environmental impacts or affects of earthquakes, climate variability and climate change. ● Significant opportunity – will help enhance vulnerability of communities, programme exceeding purpose, etc. Should be scaled accordingly (●high, ●medium, ●low significance)
<p>Cost</p> <p>£ - estimated to cost up to £10, 000 £££ - estimated to cost in the range of £10,000 to £100,000 ££££ - estimated to cost over £100,000</p>

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Annex I

Terms of Reference

Integrated Environment, Climate Change Adaptation and Disaster Risk Assessment of DFID Nepal Rural Reconstruction and Rehabilitation Sector Development Programme

Introduction

DFID South Asia is undertaking integrated environmental assessments³ of all productive⁴ programmes over the next 3 years. The **goal** of this work is to demonstrate that stretching environmental sustainability measures have been integrated into key DFID South Asia country programmes. This has been set as a Divisional target.

A draft integrated Environment Climate and Disaster (ECD) screening checklist and methodology have been prepared. These need piloting in the 5 S Asia countries. Lessons will be learnt for the sustainability of the programmes to be assessed and for finalisation of the methodology to be rolled out across all the productive sector programmes in South Asia.

An integrated assessment methodology needs to be piloted on the Rural Reconstruction and Rehabilitation Sector Development Programme (RRRSDP). The screening checklist has outlined key issues that need to be evaluated and provides a scope for the assessment. The consultants should evaluate the issues identified in the checklist using the generic methodology.

This pilot phase will also feed practical examples/experiences into Policy Division's work on a systemic evaluation of DFID's environmental screening procedures. This includes updating the system to better incorporate climate change impact and DRR (Disaster Risk Reduction) assessment requirements. It offers an opportunity to develop a practical approach that encompasses these areas and better integrate them into a more comprehensive system.

Approach

RRRSDP will involve construction of 870km rural roads, 1334m bridges, 740 supplementary infrastructure and 600 water supply schemes. The Department of Local Infrastructure and Agricultural Roads conducted a study on "Environmental Assessment and Review Procedures" (EARP) for the project. The study carried out five sample environmental reviews of rural road projects for each development region upon which it devised procedures to be followed to ensure that the environmental impacts of the

³ Assessments of potential environmental risks and opportunities to and from the programme, including Climate Change and Disaster Risk Reduction where relevant

⁴ Defined as anything grown, built, or extracted. With the potential to expand to programmes that have a key role in the management of productive sectors (legislative /governance).

projects were managed. If implemented successfully, these procedures will help to ensure that there are no significant adverse environmental impacts caused by the project.

The project presents a number of opportunities to build capacity within responsible government departments and agencies to manage the environmental assessment and management processes on this and similar projects in the future.

The DFID Environmental Screening Note (ESN) identifies that the Project Coordination Unit (PCU) and District Project Office will undertake environmental reviews to ensure that the process of identification and management of the risks and mitigation measures are successfully undertaken.

The project document does not indicate that natural hazards and related risks have been identified in the design and appraisal specifically, or evidence to indicate that disaster risk assessments are available. RRRSDP will provide technical and financial support to ensure that IEEs are conducted and mitigation measures are implemented to the standards of the Government and ADB's environmental policies.

However given the existing recurrence and future increased likelihood of disaster events from hazards such as earthquakes, floods and landslides, windstorms, hailstorms, drought and epidemics, there is a need for a comprehensive assessment of potential disaster risks from extreme events as well as vulnerabilities of the various socioeconomic groups for the provision of appropriate reduction measures. A follow up to the World Bank supported initiative for disaster mitigation presents a starting point for implementation of DRR.

Objective:

To pilot an integrated environment, climate change adaptation and disaster risk assessment of Rural Reconstruction and Rehabilitation Sector Development Programme in Nepal to evaluate its sustainability

Methodology

Environmental sustainability of the intervention will rely on the guidelines and actions identified in the project documents being implemented adequately. The programme incorporates M&E, however, for the purposes of this integrated assessment it is recommended that a review of the implementation of the guidelines is undertaken. Particular areas to focus on are:

- Quality of environmental statements and IEEs
- Inclusion of climate change and disaster risk assessments in IEE procedures
- Process for screening projects, approving IEEs and monitoring implementation of mitigation measures.
- How implementing agencies undertake their responsibilities
- Capacity building

Monitoring of these activities should already be undertaken by project partners and so initially, a review of the monitoring process and outcomes may be a first step. Sections C and D of the methodology should be completed.

Whilst RRRSDP documentation does not explicitly take into account disaster risks, Nepal is a high disaster risk country, with significant risks from climate change due to impacts of high intensity rainfall and glacial melting. Further assessment of the programme, for instance as a follow up to the World Bank supported initiative for disaster mitigation, should be undertaken in order to obtain an integrated and comprehensive picture of the disaster risks in the programme area and incorporate DRR strategies in the intervention. Sections B, C and D of the methodology should be followed.

This further assessment should consider the following opportunities for strengthening DRR and adaptation activities, which in turn will strengthen the ability of RRRSDP to meet its objectives. These include:

- Supporting links to emerging national mechanisms such as national systems and platforms for implementation of DRR and coordination of climate change adaptation generated through the NAPA (National Adaptation Programme of Action, of the UNFCCC) process.
- Deeper disaster risk and vulnerability assessments to understand the nature of the risks, how they are changing under climate change, and how this impacts on target populations;
- Building an understanding of links between disasters, vulnerability and poverty into poverty monitoring and poverty analysis;
- Developing opportunities with all stakeholders to build education and awareness on disaster risks, environmental protection, climate change and DRR measures into engagement at community levels.
- Developing indicators/tools for screening economic policies and plans, landuse, and development plans to integrate DRR activities.
- Developing and putting in place procedures for assessing disaster risks of all existing major development projects, especially infrastructure and ensuring that the design and construction of infrastructures, such as roads, market and school buildings, health posts etc meet set codes and safety standards that include natural hazard management and risk reduction elements.

As this is a developing methodology, the consultants will work closely with the DFID project team and core consultants to ensure that the lessons are learnt throughout the assessment and integrated where appropriate.

The consultants will obtain a briefing from the team leader of the core consultants (Catriona Paterson) before starting work. They should report back on their findings at the end of the field assessment and should submit the draft and final reports to the team leader and the DFID designated lead.

Outputs:

A maximum 20 page report containing:

- Assessment of programmes and recommendations to improve environmental sustainability: including time bound targets to be monitored during normal programme assessment procedures
- Recommendations on any changes to the logframe, highlighting which lines of the logframe should be altered or built upon
- Recommendations on improving the integrated assessment methodology
- Lessons learnt (including potential savings of initial integrated assessments at an early stage in programme development)
- Summary tables should be completed to summarise the evaluation of the key issues, outlining the potential significance of the risk or opportunity (high, medium, low significance), making recommendations for any future work required, including whether it can be integrated into the scope of the intervention or should be addressed through other means.
- Rough estimates of the cost implications of proposed changes (< £10, 000, £10,000 - £100,000, > £100,000).

Skills and Expertise

It is envisaged that a team of two consultants will be required. The consultants should have knowledge and experience of:

- ADB safeguards procedures
- Environmental assessment of linear developments
- Climate change impacts and adaptation
- Disaster risk reduction strategies

At least one of the consultants should have experience of working in Nepal and the other should have worked in South Asia.

Inputs

The consultant(s) will be expected to spend 10 days on the assessment and a further 5 days for producing the final report.

Timing

The assessment will take place during week commencing 9th March. A draft report will be submitted by 27th March and final report by 10th April 2009.

Annex II

Integrated environment, climate change and DRR assessment methodology

The integrated screening checklist identifies, where possible, a number of potential risks and opportunities with respect to the sustainability of the intervention. The screening checklist has highlighted issues at a number of levels:

1. ESN and/or PM identify potentially significant risks and opportunities and has addressed them in the design, safeguards and/or logframe. In this case confirmation is required that M & E is reporting sustainable outcomes. Sections C and D of the methodology should be followed.
2. ESN and/or PM miss potentially significant risks and opportunities. The screening checklist identifies potential concerns and further investigation is required to evaluate their significance and recommend mechanisms to achieve sustainable outcomes. Sections B, C and D of the methodology should be followed.
3. Insufficient information is available to establish if there are any potentially significant risks and further investigation is required to scope the issues. Sections A, B, C and D of the methodology should be followed.

The methodology outlined below should be used to investigate the risks and opportunities to establish their significance and make a judgement on the sustainability of the intervention from an environment/DRR/climate change perspective. Focus should be on the issues identified in Section C of the screening checklist.

A	Key Programme related risks and opportunities and related analysis
1	<p>Are there any (direct/indirect⁵) environmental risks and/or opportunities associated with the intervention?</p> <p>Does the ESN adequately identify the risks and opportunities?</p> <p>Are there appropriate actions in the logframe and PM?</p> <p>Are they being implemented?</p>
2	<p>What key climate and disaster risks could impact the project area, now and in the future? Are there any indirect risks and opportunities of the project vulnerability to climate change impacts, disaster events, or energy/greenhouse gas emissions</p> <p>How do they relate to programme objectives and activities?</p>

⁵ A direct risk or opportunity is an impact that directly results from an activity in an intervention (eg depletion of groundwater resource from irrigation). An indirect risk or opportunity is an impact that, although not directly resulting from an activity, would not have occurred had the intervention not occurred/funding not been provided (eg increased healthcare waste due to improved health service delivery in a health sector budget support programme; or loss of livelihoods of the poorest due to land reclamation for economic development and growth).

	<p>Are there appropriate actions in the logframe and PM?</p> <p>Are they being implemented?</p> <p>Are there risk and vulnerability assessments available?</p> <p>What data do they present and at what spatial scales?</p> <p>Are these publicly available?</p> <p>Which institutions hold or manage this data?</p>
B	Existing risk management
4	<p>What technical and institutional capacity is there to prepare for and respond to environmental management, disaster management and climate change, including within the sector (eg policies, plans, institutions, research, knowledge management)?</p> <p>Are there adequate relevant policies, plans, institutions, research, knowledge management in place? List all relevant ones.</p> <p>Do all relevant institutions have clearly defined roles and responsibilities? List relevant institutions.</p> <p>Are there any areas of good practice in executing these roles and responsibilities, or clear gaps in capacity to do so?</p> <p>Is there a coordination mechanism between these agencies and the project partners? List relevant partners.</p> <p>Are further measures required in respect to environmental management, climate change impact and disaster risk reduction?</p> <p>What further analysis required in respect to environmental management, climate change impact and disaster risk reduction?</p> <p>Have any gaps in capacity been identified?</p> <p>Are appropriate measures in place to strengthen capacity, if required?</p> <p>Are capacity strengthening measures being implemented successfully? How is their success being measured?</p> <p>Is there a need for further institutional and technical capacity assessment?</p>
5	<p>Does the programme have mechanisms in place to manage risks and opportunities related to the programme (prevent or reduce hazards, tackle vulnerability and strengthen adaptive capacities and resilience) related to environment, climate and disaster?</p> <p>What relevant mechanisms have been put in place to manage risks? (eg environmental management plans/environmental analyses).</p> <p>What technical capacity exists to prepare and implement them?</p>

	<p>Are they likely to capture and manage all risks and opportunities associated with the programme?</p> <p>If not, what are the gaps? How can this be resolved?</p> <p>Are the risks and opportunities and relevant responses being monitored and evaluated?</p> <p>If, yes, are the M&E reports being shared with stakeholders? Are mechanisms in place to ensure any residual risks and opportunities are addressed?</p> <p>If no, why not? What needs to be done to resolve this?</p>
6	<p>Are economic policies and plans being implemented to reduce the vulnerability of activities to climate-related shocks and stresses? Do these take into account environment protection and disaster risk reduction?</p>
7	<p>Are social development policies and plans being implemented to reduce the vulnerability of populations most at risk to climate change impacts, environmental degradation and disaster events?</p>
8	<p>Does planning and management of human settlements or infrastructures incorporate environmental management and disaster risk reduction elements, including enforcement of building codes? Do these consider climate change?</p> <p>Is there a spatial or strategic/economic development plan in place or being developed?</p> <p>How do they consider environmental/DRR/Climate change risks and opportunities?</p> <p>What was the process/mechanism for integrating environment/DRR/climate risk assessment ?</p> <p>Are there any opportunities to improve this process?</p> <p>Are there building codes and construction guidance for the infrastructure component of the programme?</p> <p>If yes, do they ensure environmental risks are prevented/mitigated and opportunities are maximised?</p> <p>If no, why not?</p> <p>What needs to be done to resolve this?</p>
9	<p>Are financial reserves and contingency mechanisms in place to enable effective response and recovery when required?</p> <p>For what eventualities might reserves and contingencies be required in the programme context?</p> <p>What contingencies exist outside the project to cover such eventualities?</p>

<p>C</p>	<p>Monitoring and Evaluation.</p> <p>Are there current M&E arrangements capturing all the environment, climate risk and DRR aspects of the programme?</p> <p>What evidence is there from the programme M&E that all risks and opportunities are being managed sustainably?</p> <p>Are the results being shared with all the stakeholders?</p> <p>Are there mechanisms to ensure that the residual risks and opportunities are addressed?</p> <p>Are there any residual risks and opportunities not being addressed by the programme?</p> <p>How significant are these?</p> <p>Do all programme partners understand and agree?</p> <p>Are there any constraints to implementing them?</p> <p>How can the constraints be resolved?</p> <p>Should there be any changes to the logframe?</p>
<p>D</p>	<p>Summary and recommendations, including possible additional areas for analysis.</p> <p>Are there any recommendations which would improve the sustainability of the programme?</p> <p>How significant are they (explain and colour code in summary table)?</p> <p>Is further analysis required? If so, in which specific areas of the programme's activities?</p>

Annex III

NAMES OF PERSONNEL INTERVIEWED

1. Mr. Kapil Dev Gyawali, Environmental Associate, RRRSDP
2. Mr. Narayan Baral, Engineer, PCU
3. Mr. Jagadish Sharma, Engineer, PCU
4. Mr. Robin Chitrakar, Water Supply Specialist, RRRSDP CISC
5. Mr. Bidhan Rajbhandari, Deputy Project Leader, RRRSDP
6. Mr. Batu Krishna Uprety, MoEST
7. Mr. Indu Sharma Dhakal, Department of Roads
8. Mr. Ram Prasad Pathak, Unit Chief, Geo-environmental & Social Unit, DOR
9. Mr. Thakur Raj Pant, DOLIDAR and RRRSDP
10. Mr. Bishnu Nath Sharma, Joint Secretary, MLD
11. Mr. Dandu Raj Ghimire, Head of Environment, MLD
12. Mr. Shashi B. Bist, Department of Water-induced Disaster Prevention
13. Mr. Dhruva Gautam, Independent Consultant & Expert on DRR & CC

Other Personnel Contacted

Dr. Chandra Shrestha, DFID, Nepal

Mr. Simon Lucas, Climate Change and Inclusive Growth Adviser, DFID Nepal

Annex IV

LIST OF PARTICIPANTS

Stakeholders Consultation Workshop
On

"Integrated Environment, Climate Change Adaptation and Disaster Risk Assessment"

S. No.	Name	Designation	Organization
1.	Mr. Adhir Sharma	Deputy Program Director	Heretas
2.	Mr. Chiranjivei Sharma	Environmentalist	RAP
3.	Mr. Ram Chandra Kandel	Director	NEST
4.	Mr. Tarn Nidhi Bhattarai	Coordinator	NDRI
5.	Ms. Kiran Kharel	Program Officer	Omni Development Society
6.	Mr. Ram Chandra Kharel	(Not recorded)	IUCN
7.	Mr. Rijan Bhakta Kayastha	Assistant Professor	KU
8.	Mr. Rijesh Thapa	Land and Water Analyst	ICIMOD
9.	Mr. Kapil Dev Gyawali	Environment Associate	RRRSDP/CISC, RCSP
10.	Mr. Rabin Dhakal	Resettlement Adviser	DIRLP/CISC, RCSP
11.	Mr. Indhu Sharma Dhakal	SDE	DOR
12.	Mr. D. P. Adhikari	Lecturer	TU
13.	Mr. Maksha R. Maharajan	Chief of Party SAGGN Program	CARE Nepal
14	Ms. Rita Dhakal	Disaster Risk Reduction Manager	CARE Nepal
15	Mr. Subodh Sharma	Professor	KU
16.	Mr. Keshav P Sharma	DDG	DHM
17	Mr. Simon Lucas	Advisor	DFID
18.	Mr. Drona R Ghimire	Environment Specialist	World Bank
19	Ms. Prabha Pokhrel	T.L.	NNGO/DRILP
20.	Mr. Pitambar Aryal	Director Disaster Mgmt. Dept.	Nepal Red Cross
21	Mr. Manik Lal Shrestha	SDE	Department of Irrigation
22.	Mr. Keshav Kumar Sharma	Advocacy Officer	Practical Action
23.	Mr. Ratna Karki	Project Director	RRN
24	Ms. Moon Shrestha	CC Officer	WWF

**CLIMATE CHANGE IN NEPAL
TOWARDS UNDERSTANDING ECD ISSUES
ON RURAL ROAD CONSTRUCTION**

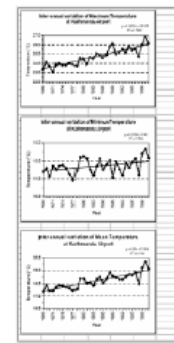
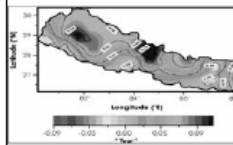
Ahsan Uddin Ahmed
and
Nawa Raj Khatiwada

A DFID commissioned Team working to examine potential of integrated environment, climate change adaptation and disaster risk assessment

Kathmandu, 20 March 2009

CLIMATE CHANGE IN NEPAL

Analysis of recent climatic trends reveals a **significant warming trend in recent decades** which has been even more pronounced at higher altitudes (Shrestha et al., 2000).



PRECIPITATION CHANGE

Precipitation data does not reveal any significant trends, although precipitation in Nepal is found to be influenced by or correlated to several large scale climatological phenomena, including El Niño (Shrestha et al. 2000).

In this sense the trends in observational data is in agreement with projections made by climate models.

There is an clear indication that the **extreme precipitation events in the central Nepal are increasing in the recent decade.**

CLIMATE CHANGE IN NEPAL

Climate change scenarios for Nepal across multiple general circulation models show considerable convergence on **continued warming**, with country averaged mean temperature increases of 1.2°C and 3°C projected by 2050 and 2100.

Year	Temperature change (°C) mean (standard deviation)			Precipitation change (%) mean (standard deviation)		
	Annual	DJF ^a	JJA ^b	Annual	DJF	JJA
Baseline average				1433 mm	73 mm	894 mm
2030	1.2 (0.27)	1.3 (0.40)	1.1 (0.20)	5.0 (3.85)	0.8 (9.95)	9.1 (7.11)
2050	1.7 (0.39)	1.8 (0.58)	1.6 (0.29)	7.3 (5.56)	1.2 (14.37)	13.1 (10.28)
2100	3.0 (0.67)	3.2 (1.00)	2.9 (0.51)	12.6 (9.67)	2.1 (25.02)	22.9 (17.89)

Wigley et al., 2004 (unpublished)

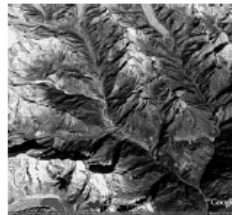
What happens when the earth get warmer?

CLIMATE RELATED DISASTERS IN NEPAL

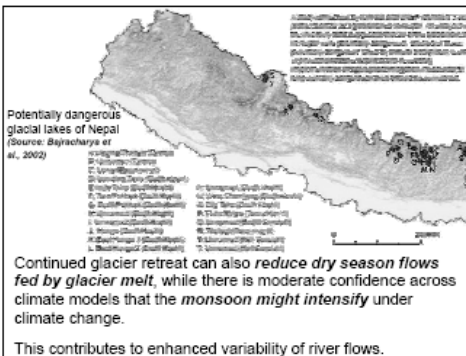
	Killed	Injured	Homeless	Affected	Damage US \$
All disasters	20,927	7,794	153,550	7,052,754	1,316,412
Floods	5,003	725	69,350	1,531,125	990,613
Drought	0	0	0	4,400,000	1,000
Extreme Tem	69	210	0	210	
Windstorms	97	19	0	154	3600
Climate related	5160	854	49,350	5,631,599	1,004,213
Percentage contribution of climate related disasters to total disasters	24.7 %	12.2 %	45.2 %	84.1 %	79.3 %

Source: CREW, 2013

Warming trends have *already* had *significant impacts* in the Nepal Himalayas – most significantly in terms of *glacier retreat* and significant increases in the size and volume of *glacial lakes*, making them more prone to Glacial Lake Outburst Flooding (GLOF).



Dig Tsho glacial lake (centre left), Langmoche Khola and Shote Koshi
(Source: Google Earth)



An analysis of water resources in Nepal identifies two critical impacts of climate change – GLOFs and variability of river runoff – both of which pose significant impacts not only on hydropower, but also on rural livelihoods and agriculture (Regmi, 2007).

Questions remain:

- Will GLOFs cause any harm to rural infrastructure?
- Will invigorated monsoon peak-flows require increased allowance for water drainage?
- Will increased flow volume inflict upon additional risks from land slide?
- Will there be incidence of drying up of springs, especially during the dry season?

INTEGRATED ENVIRONMENT, CLIMATE CHANGE, AND DISASTER RISK (ECD) ASSESSMENT METHODOLOGY

Ahsan Uddin Ahmed
and
Nawa Raj Khatiwada

A DFID commissioned Team working to examine potential of integrated environment, climate change adaptation and disaster risk assessment

Kathmandu, 20 March 2009

INTEGRATED ECD ASSESSMENT METHODOLOGY

What is ECD ?
Environment Climate Change Disaster Risks

The objective of such an assessment is to integrate these interlinked concepts and issues and examine whether the long-term sustainability of development initiatives is achieved.

..... avoided risks on environment

..... to avoid risks on Investments and benefit streams from all known and probable hazards

DFID South Asia is undertaking integrated environmental assessments of all productive programmes over the next 3 years. The goal of this work is to demonstrate that stretching environmental sustainability measures have been integrated into key DFID South Asia country programmes.

INTEGRATED ECD ASSESSMENT METHODOLOGY

Category-1: Are potentially significant risks and opportunities identified and are addressed in the design, safeguards and/or log-frame?

Category-2: Are potentially significant risks and opportunities missed by project related documents?

When the screening tool/checklist identifies potential concerns and further investigation is deemed necessary to evaluate their significance and mechanisms are recommend to achieve sustainable ECD outcomes.

Category-3: When insufficient information is available about the project to establish if there are any potentially significant risks and further investigation is required to scope the issues.

The issue here is,

instead of project-related activities directly or indirectly causing environmental degradation, whether

- The investments related to the project will likely to be wasted due to ECD?
- Accrual of benefits and/or project effectiveness could be diminished due to ECD?
- The project will provide an opportunity which might not be fully realized due to ECD?
- Any significant opportunity provided by the changed ECD realities could be missed completely due to implementation of the project?

The Integrated ECD Assessment Methodology helps to investigate by means of four groups of questions.

Group-A: Key Programme related risks and opportunities and related analysis

Are there any (direct/indirect) environmental risks and/or opportunities associated with the intervention?

What key climate and disaster risks could impact the project area, now and in the future? Are there any indirect risks and opportunities of the project vulnerability to climate change impacts, disaster events, or energy/greenhouse gas emissions ?

Are there risk and vulnerability assessments available?

Group-B: Existing risk management

What technical and institutional capacity is there to prepare for and respond to environmental management, disaster management and climate change, including within the sector (e.g. policies, plans, institutions, research, knowledge management)?

Does the programme have mechanisms in place to manage risks and opportunities related to the programme (prevent or reduce hazards, tackle vulnerability and strengthen adaptive capacities and resilience) related to environment, climate and disaster?

Are economic policies and plans being implemented to reduce the vulnerability of activities to climate-related shocks and stresses? Do these take into account environment protection and disaster risk reduction?

Group-B: Existing risk management Contd.

Are **social development** policies and plans being implemented to reduce the vulnerability of populations most at risk to climate change impacts, environmental degradation and disaster events?

Does planning and management of **human settlements or infrastructures** incorporate environmental management and disaster risk reduction elements, including enforcement of building codes? Do these consider climate change?

Are **financial reserves and contingency mechanisms** in place to enable effective response and recovery when required?

Group-C: Monitoring and Evaluation

Are there current M&E arrangements capturing all the environment, climate risk and DRR aspects of the programme?

Are there any residual risks and opportunities not being addressed by the programme?

How significant are these?

Are there any constraints to implementing them?

How can the constraints be resolved?

Should there be any changes to the logframe?

Are there mechanisms to ensure that the residual risks and opportunities are addressed?

What evidence is there from the programme M&E that all risks and opportunities are being managed sustainably?

Are the results being shared with all the stakeholders?

Group-D: Summary and recommendations, including possible additional areas for analysis

Are there any recommendations which would improve the sustainability of the programme?

How significant are they?

Is further analysis required? If so, in which specific areas of the programme's activities?

INTEGRATED ECD ASSESSMENT METHODOLOGY	APPROACH OF THE METHODOLOGY
Category-1: When potentially significant risks and opportunities are identified and are addressed in the design, safeguards and/or log-frame.	Category-1: Assess M&E and recommend additional analysis/understanding
Category-2: When potentially significant risks and opportunities are missed by project related documents.	Category-2: Assess Risk Management, M&E and re-comm. addt. analysis
Category-3: When insufficient information is available about the project to establish if there are any potentially significant risks and further investigation is required to scope the issues.	Category-3: Assess fully, using all aspects (e.g. risks & opport., risk mgmt capacity, M&E and recommend addt. analysis

1

**A Review of Environmental Assessment
Process For RRRSDP**

Nawa Raj Khatiwada
and
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A DFID commissioned Team working to examine
potential of integrated environment, climate change
adaptation and disaster risk management

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2

Presentation outline

- Project interventions
- Scale of intervention
- EA Requirement in Nepal
- IEE Category
- IEE in RRRSDP
- Way ahead

3

Project interventions

- ◊ Rural roads
- ◊ Bridges
- ◊ Water supply and sanitation
- ◊ Supplementary infrastructure

4

Scale of intervention

- ◊ Kamidanda-Taldhunga Rural road in Kavre district (42km, 20ha)
- ◊ Small bridges along such roads
- ◊ Water supply schemes (<1000P, piped)
- ◊ Village trails, Trail bridges, micro-irrigation, schools

5

EA Requirement in Nepal

IEE category

- ◊ New roads (district, urban)
- ◊ Major bridges
- ◊ Tunnels
- ◊ Upgrading, rehabilitation and re-construction of highways and feeder roads

6

EA Requirement in Nepal

IEE category

- ◊ If any project costs NRs 50 - 250 million

All of the road projects under RRRSDP fall under this category

Kamidanda-Taldhunga served as a pilot IEE study

IEE has already been approved

IEE Process in RRRSDP	#7
<ul style="list-style-type: none"> - Proponent: DDC or DTO - IEE study carried out by DTO with the assistance from DISC (District Implementation Support Consultant) - ToR : by DDC or DTO - Approving authority : MoLD - Implementation by contractor - Monitoring- DTO, DISC, CISC, UG 	

Small interventions	#8
<ul style="list-style-type: none"> - Sub-projects exempted from IEE category - Construction phase impacts - ADB REA Checklist - Environmental Statement Report 	

EPA and EPR	#9
<p>Preamble if EPA</p> <p>.....to maintain clean and healthy environment by minimising the <i>adverse impacts</i> likely to be caused from <i>environmental degradation</i> on human beings, wildlife, plants, nature and physical objects and to <i>protect environment</i> with proper use and management of natural resources.....</p>	

EPA and EPR	#10
<ul style="list-style-type: none"> - Development projects - Threshold limits - Biological impact - Physical impact - Social, economic and cultural impacts 	

Content of the IEE	#11
<ul style="list-style-type: none"> - Physical environment - land use change, erosion and landslides, water pollution - Biological - Forest loss, wildlife, invertebrates - Social and cultural 	

Emerging Issues	#12
<ul style="list-style-type: none"> - How should we proceed to incorporate the Climate Change and Disaster Risk related issue in the development process (EA studies)? 	

Brief Questionnaire

Q1 In your views, what are the major gaps in mainstreaming concerns regarding climate change and disaster risk reduction in the development process of Nepal?

Q2 What needs to be done to address gaps

2a *Regarding climate change?*

2b *Regarding disaster risk reduction?*

Q3 Do you think the current environmental assessment procedures (IEE and EIA) are being done judiciously? Yes/No (please tick)

Q4 Do you think the current environmental assessment procedures (IEE and EIA) need a reform? Yes/ No (please tick)

If yes, give one or two major reasons.

1.

2.

Please mention how the reform may be approached?

Q5 If you have any additional suggestion in this regard, please mention.

Annex V

Detailed Workplan

D0	15	Sun	Travel to Nepal, preparation
D1	16	Mon	Finalizing Scoping of the activities & the tentative workplan Plan for stakeholders' workshop Plan for one-to-one meetings with Officials/stakeholders
D2	17	Tue	Meeting with the Mission, understanding the project in question Interviewing RRRSDP personnel (PCU & CISC) <ul style="list-style-type: none"> 1. Mr. Kapil Dev Gyawali, Environmental Associate 2. Mr. Narayan Baral, Engineer, PCU 3. Mr. Jagadish Sharma, Engineer, PCU 4. Mr. Robin Chitrakar, Water Supply Specialist 5. Mr. Bidhan Rajbhandari, Deputy Project Leader, RRRSDP
D3	18	Wed	Collation and scanning of available literature/documents Primary evaluation of ESN of DFID and IEEs being conducted for RRRSDP
D4	19	Thu	Primary evaluation of EARP in view of the screening tool Preparation of questionnaire for the workshop Scanning legal provisions for Environmental Assessment Processes
D5	20	Fri	Preparation of presentations for the workshop/handouts Workshop with Government Officials, Researcher/Academics, NGOs
D6	21	Sat	Application of ECD methodology in RRRSDP Initial assessment
D7	22	Sun	Meeting with Government/other Stakeholders <ul style="list-style-type: none"> 6. Mr. Batu Krishna Uprety, MoEST 7. Mr. Indu Sharma Dhakal, Dept. of Roads 8. Mr. Ram Prasad Pathak, Unit Chief, Geo-environmental & Social Unit, DOR 9. Mr. Thakur Raj Pant, DOLIDAR & RRRSDP 10. Mr. Bishnu Nath Sharma, Joint Secretary, MLD 11. Mr. Dandu Raj Ghimire, Head of Environment, MLD 12. Mr. Shashi B. Bist, Dept. of Water-induced Disaster Prevention 13. Mr. Dhruva Gautam, Independent Consultant & Expert on DRR & CC
D8	23	Mon	Debriefing meeting with DfID AUA: Flying out from Nepal, NRK: Writing the report

March 24 & 26 Writing the zero order draft for the DFID Mission
Mar 30-Apr 1 Writing up and consolidation of draft report
Apr 17 (tentative) Incorporation of comments and finalization of the Report

Annex VI

Implications of Climate Change in Nepal

Current and future climate trends

Nepal has diversified climate regimes varying from alpine to tropical climate within the 200 km span from the northern to southern borders (Shrestha *et al.*, 2003). Monsoon plays significant role towards defining the climate regimes of Nepal, while different climate regimes are also influenced by altitude (ICIMOD, 1996). There are four seasons, as defined below:

Spring (Mar-May) — The weather is dry and hot, with occasional rain showers.

Summer Monsoon (Jun-Sep) — Very hot, with 80% of annual rainfall.

Autumn (Oct-Nov) — This short season is warm and humid.

Winter (Dec-Feb) — The climate begins turning cool and dry, and finally cold.

The mean temperature is about 15°C, while the averages increase from north to south with exceptions in the mountain valleys. Average rainfall for the country is 1,500mm, and it diminishes when moving from the eastern to western part of the country. The rain shadow areas are found in the northwest corner, having the least rainfall. It also varies by altitude: heavy downpours occur generally below 2000m whereas areas over 3,000m experience a lot of drizzle. Nepal generally receives abundant rainfall, however there is a marked seasonal distribution. The temporal distribution is of great concern regarding the occurrence of floods, landslides, and other extreme events (Shrestha *et al.*, 2000).

Because of high snowmelt rates in the mountains, many of the rivers are perennial with steep gradient. Most floods occur during the monsoon season when heavy precipitation coincides with snowmelt in the mountains. Several major rivers, including the Koshi, Gandaki, Karnali, Mahakali, and the Mechi, flow mostly from north to south and are the major tributaries of the major rivers of the Indian Subcontinent. As the rivers lose gradient near terai region, they become increasingly responsible to cause floods. There are about 6,000 rivers and rivulets, the total length appears some 45,000 km (ICIMOD, 1996).

In recent past there have been a few studies which provide a fair understanding regarding Nepal's climate change in near future. Past climatic trends have been examined by Shrestha *et al.* (1999), which reveals that average temperature in Nepal is increasing at a high rate. The warming seems to be consistent and continuous after the mid 1970s. The average warming in annual temperature between 1977 and 1994 was 0.060 c/yr (Shrestha *et al.*, 1999). The warming is found to be more pronounced in the high altitude regions of Nepal such as the middle mountain and the high Himalaya, while the warming is significantly lower or even lacking in the terai and sivalik regions.

In addition to showing spatial differences in warming, there are temporal differences as well. In the winter, warming is found to be more pronounced compared to other seasons. According to one recent study, Nepal's temperature is rising by about 0.41 degrees Celsius per decade. Another study conducted in the vicinity of Tsho Rolpa Glacial Lake in Dolakha District suggests that mean temperature is increasing annually by 0.019 degrees Celsius with an increase in average summer temperature of 0.044 degrees Celsius (Regmi and Adhikary, 2007). Rainfall is found to be increasing by 13mm per year, while the number of rainy days is decreasing by 0.8 days per year. Consequently, river flow is reportedly increasing at 1.48 m³/s per year, which is about 1.5 times higher than increased precipitation. Dahal (2006) inferred that high increases in summer river flow as a consequence of high summer temperatures may be attributed to fast glacial melt/retreat (Dahal, 2006).

Precipitation in Nepal is found to be influenced by or correlated to several large scale climatological phenomena including El Nino/Southern Oscillation, regional scale land and sea surface temperature changes and extreme events such as volcanic eruptions. Mean annual precipitation is found to be increasing, as is the occurrence of intense rainfall (Regmi and Adhikary, 2007). The latter causes increased erosion of soils and banks, while triggering enhanced sedimentation and sand casting on fertile lands.

Communities of different parts of Nepal have already begun experiencing unusual changes in weather patterns. Recent studies suggest that weather-related extreme events such as excessive rainfall, longer drought periods, landslides and floods are increasing both in terms of magnitude and frequency (Regmi and Adhikary, 2007; Dahal, 2006). Flood related deaths are likely to increase. It is anticipated that more floods and glacial lake outbursts would adversely affect irrigation and water supply systems, damage roads, bridges, settlements and productive lands. Land degradation, especially sand casting will reduce crop productivity, while irregular rainfall in pre-monsoon months would aggravate moisture stress, resulting into seasonal food insecurity amongst poor farming communities.

Changes in weather patterns have also brought good news and opportunities for some communities. For example, farmers of Mustang and Manang districts have noticed improved apple sizes in recent years. However, such gains may perhaps be outweighed by hardships faced by a large majority across Nepal. For example, Dahal (2005) noticed an increase in water leakage into traditional houses, which people perceived as due to new precipitation patterns.

The hydro-geophysical realities of the country are compounded by low level of development and human capacity, making it difficult to offer substantial response to climate change. The studies mentioned above identify the following vulnerable sectors:

Water resources — Changes in temperature and precipitation regime are expected to alter the hydrological cycle and water resources of Nepal. An analysis of mean monthly discharge shows that, as a consequence of rapidly melting snow cover on mountaintops due to global warming, the peak discharge would shift from August to July. This could lead to increased risk of early flooding and more pronounced variations in water availability throughout the year. Since there is a likelihood of diminishing rainfall in winter and pre-monsoon months, drought could become a problem in some areas. Due to dwindling resource base and groundwater recharge potential under climate change, water supply that are dependent on natural recharge and stream flows might face difficulties. Rural communities would be the worst sufferers with dwindling water supply.

Analysis of records of glacier fluctuations in the Hindu-Kush-Himalayan region over the past 150 years shows that, while examples exist of both advance and retreat, the glaciers have mostly been retreating (Chalise, 1994; Higuchi *et al.*, 1980; Kadota *et al.*, 1993). According to the IPCC assessment reports, many glaciers will retreat and smaller glaciers may disappear altogether in the coming decades as a consequence of global warming (IPCC, 2007; Mool *et al.*, 2001). Published literature suggest that the most pressing risk for Nepal stems from the potential increase of climate-related disasters, particularly of Himalayan glacial lake outburst floods (GLOF). Geoscientists have noted that, with glaciers retreating due to global warming, the number and volume of GLOF hazards is growing (WWF, 2006). There is a growing body of evidences that the number of GLOFs are on the rise in Nepal. A UNEP/ICIMOD study found over 3,252 glaciers, 2,323 glacial lakes, and 20 potential GLOF sites in Nepal (UNEP, 2002).

Hydropower — It is generally believed that the key to transition to industrial economy for Nepal rests with hydropower potential of the country. Climate plays a large role in determining the feasibility of hydropower projects, and the potential change in precipitation and temperature is likely to affect runoff. This in turn affects the potential electricity generation through the continuous operation of a hydropower plant. Extreme events such as GLOFs have the largest potential affect on plants, as the force of a GLOF is so great that an entire plant can be wiped out in a very short period.

In addition to GLOFs, the greatest impact on hydropower will be the increased variability of river runoff. Two factors will contribute to this: 1) glacier melt, and 2) precipitation patterns. According to Shrestha (2003), runoff will initially increase as glaciers melt, then later decrease as deglaciation progresses. Decreased winter snowfall means less precipitation would be stored on the glaciers, so this would in turn decrease the spring and summer runoff in the long run.

Winter runoff, on the other hand, would increase due to earlier snowmelt and a greater proportion of precipitation falling as rain. As a consequence of such inter-annual discharge variability in rivers, not only the operating efficiency of hydropower plants would be decreased, it would also affect availability of drinking water.

Extent of precipitation and runoff largely determine landslides and debris flows. Shakya (2003) points out that approximately 20% of rainfall transports 90% of debris volume in Nepal. With the intense rainfall projected for the monsoon season under climate change, increased debris volume on river beds would decrease discharge capacity of rivers, which in turn would increase flood vulnerability of those rivers.

Agriculture — Since crop agriculture is highly dependent on the weather, any change in rainfall pattern is likely to have serious consequences for Nepal's agriculture. Winter and spring crops are likely to be the worst hit due to decreased precipitation from November to April. Rice yields would fall in the Western and Far Western Regions where a greater population of the poor live, threatening their food security.

Irrigation and Domestic Water Usage — Despite the fact that only about 38% of agricultural land in Nepal are irrigated, irrigation indeed provides lifeline to Nepalese crop agriculture, especially in the Terai region. Over 80% of all water in Nepal is used for irrigation. The country's 6,000 rivers feed irrigation systems, power grain mills, and supply drinking water for villages for thousands of miles downstream.

Higher temperatures, increased evapo-transpiration and decreased winter precipitation may bring about more droughts in Nepal. In addition, many rivers may face highly variable flows with climate change. Increased variability would severely impact irrigation and the farming livelihoods dependent on it.

Climate change will add complications to the functioning and performance of road networks. Increased flood peaks will cause an increase in peak-flow, which might increase risks to prevailing water infrastructures such as bridges. Any mismatch between flow allowance and peak flow might put such structures in high risk, thereby risking disfunctioning of the network. However, the risk and subsequent cost requirement to reestablish the network would be much less for rural roads than that for highways. An incident of GLOF would have significant adverse impacts on current road networks.

Higher flow volume in monsoon might trigger additional risks of landslides, which in turn would adversely affect functioning of the road network. For rural roads, the impacts might be significantly less. However, frequent landslides would escalate cost of maintenance and monitoring.

Diminishing rainfall in dry season might desiccate top soils with increased index of aridity. This in turn would trigger accumulation of additional dust particles on surface drainage systems (drains etc.).

Annex VII

CURRENT LEGAL AND POLICY ENVIRONMENT FOR ENVIRONMENTAL ASSESSMENT IN ROAD SECTOR

Local Self-Governance Act (LSGA) (1999) and Local Self-Governance Regulation (LSGR) (1999) were promulgated with an aim to decentralize the development authority and service delivery responsibility to District Development Committees (DDCs), Village Development Committees (VDCs) and municipalities (called Local Bodies or LBs collectively). The Act empowers VDCs, municipalities and DDCs to take responsibility for development programs and service delivery in their respective jurisdictions.

Local Infrastructure Development Policy (2004) was formulated as per the provisions of LSGA. After the promulgation of the policy, a two tier infrastructure development hierarchy (strategic or central level and local level) was envisioned by the GoN. This policy was designed to make local infrastructure policy and strategy consistent with the LSGA and to harmonize donor and government practices in the sector. Now, the responsibilities of local level infrastructure development rely on the DDCs, VDCs, and/or municipalities.

The *Three-Year Interim Plan (2007/08–2009/10)* has a focus on improving the local governance and community development and envisions demand-driven, targeted, and community-focused and specific goal-oriented schemes and social mobilization. It specifies decentralization as a main means of enhancing good governance and a strategy for promoting people's participation and empowerment.

Environmental Protection Act (EPA) (1997) and Environmental Protection Regulations (EPR) (1997) put forward a legislative framework to identify the environmental impacts likely to be caused by development activities and implement mitigation measures or minimize the impacts. According to the legislation, all development projects should first be screened using criteria that are based on the scale of project stipulated in the Schedule 1 and Schedule 2 of EPR to determine the level of environmental assessment required. Projects that could result in some environmental impacts are required to conduct Initial Environmental Examination (IEE) and large projects that could result in major environmental impacts are required to go through an Environmental Impact Assessment (EIA) process. Projects smaller than those needing IEE are assumed to be exempted from the environmental assessment process, considering that smaller projects do not cause significant environmental damage.

Land Acquisition Act (1977) and Land Acquisition Regulations (1963) give legal provision to acquire the land for development projects. The Land Acquisition Act (1977) and the Land Acquisition Rules (1969) are the two main legal instruments that specify

procedural matters of land acquisition and compensation. Articles 3 and 4 of the Land Acquisition Act empower GoN to acquire any land at any place giving compensation and all other expenses pursuant to the Act for any public purpose. The regulations deal with the compensation rate, competent authority for compensation, and determination of the amount of compensation. If road projects temporarily require land and other properties during construction, rehabilitation, and maintenance, compensation is determined by a committee chaired by the District Administration Officer (CDO). Provisions are also detailed for compensation for the extraction of construction materials.

The *Forest Act (1993) and Forest Regulations (1995)* recognize the importance of forests in maintaining a healthy environment and distinguish the forests in the form of Government, protected, community, leasehold, and religious forests. Broadly speaking, the forests remain the property of GoN but are managed according to dedicated approved action plans by the forest user groups (community, private, or religious) under the supervision of a District Forestry Officer (DFO). The DFO may penalize forest users if the action plans are not adhered to, or if there are adverse environmental effects.

The *National Parks and Wildlife and Conservation Act (1973)*, as amended 1993, is the key legislation for wildlife conservation with provisions for national parks, conservation of species in their natural habitats, and it controls hunting, protection, management, and utilization of special sites and conduct of the users. The legislation provides a strict approach and mandates the authority of the Department of National Parks and Wildlife Conservation to regulate the national parks, wildlife reserves, controlled (strict) nature reserves, hunting reserves, and conservation areas.

The *Soil and Watershed Conservation Act (1982)* makes provision to control floods, landslides, and soil erosion in a highly regulatory framework (Watershed Conservation Rules, 1985). The Watershed Conservation Officer is the authority and the district Watershed Conservation Committee must implement watershed conservation practices and public participation for soil and land protection.

The *Water Resources Act (1992) and Water Resources Regulations (1993)* have established arrangements for the rational use of surface and underground water. The Act seeks to prevent environmental and hazardous effects from the use of water and prohibit water pollution by chemicals, industrial waste, or litter. Water may only be used in a manner that does not permit soil erosion, landslides, or floods.

The *Explosive Material Act, 1973*, specifies that if construction activities require the use of explosives, then in accordance with this Act, prior approval of the Chief District Officer (CDO) is needed to purchase such explosives.

The *Public Road Act, 1973*, is the governing legislation for construction and operation of roads in Nepal. The Act prohibits the construction of permanent structures (buildings) in a defined distance from the rural road, i.e., the road agency has the authority to manage the land within the right of way (ROW).

Annex VIII

THE LEGAL PROVISIONS FOR ENVIRONMENTAL ISSUES IN NEPAL

The legal provisions for environmental issues are centered in Nepal on the following major points:

- a. Environmental assessment is mandatory for infrastructure projects that have potential to create significant environmental impacts mainly in terms of physical activities. The scale of the project or a sub-project (defined as an activity based on location, type or magnitude), its location and the scope of environmental impacts generated determine whether an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) needs to be carried out. For RRRSDP, IEE is conducted according to the statutory requirements.
- b. The executing body of the sub-project should serve as the proponent of IEE (or EIA) study and is responsible for commissioning the environmental assessment and implementation of environmental management plan (EMP).
- c. The Terms of Reference (ToR) for IEE is approved by the concerned Ministry (i.e., MLD) while the Scoping Document and ToR for EIA study are approved by the Ministry of Environment, Science and Technology (MoEST).
- d. The legislation provisions a mandatory public consultation. While carrying out an IEE, a public notice needs to be published in a national newspaper and the same is also put on the notice boards of the concerned local authorities. A deed of public enquiry (*Muchulka*) needs to be collected from the authorities.
- e. The responsibility of implementing the mitigation measures identified in the study reports lies with the executing authority (i.e., DoLIDAR) or the proponent (i.e., DDC).
- f. Monitoring and auditing responsibilities have been delegated to the concerned Ministry and MoEST.
- g. Provisions for compensation and punishment for violators during the course of IEE and EIA preparation, implementation, and monitoring are also clearly defined by the EPA and EPR.

Annex IX

POTENTIAL ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES

EPR categorically provisions to describe the biological, physical, and economic, social and cultural impacts caused by the intervention. Each of the impacts are categorized as discussed below and the significance is assessed as per their magnitude, spatial coverage and duration.

- a. *Biological resources.* If any kind of forest falls under the sub-project area, it is essential to know the number of trees needed to be removed and the likely disturbances to the wildlife and birds in the project area or its proximity. If the sub-project will clear specimen trees or protected tree species, an assessment would be required. Similarly, if any natural water bodies (such as rivers or lakes) also lie in the sub-project area, it is essential to know if there will be significant impacts on the river or lake ecosystem. If the impacts are identified then mitigation measures must be suggested (for example, loss of trees due to forest clearance must be compensated by tree plantation as per the Forest Act and Regulations).
- b. *Land use, landscape, natural drainage, aesthetic qualities.* The intended road project may modify the overland flow patterns causing no flow or reduced flow in some natural channels and high/concentrated flow in others. This may induce a risk of instability or soil erosion and ultimately disruption in the associated ecosystem. Similarly, sub-project activities may lead to change in value of the land leading to alteration in existing land use. Agriculture land may be used to establish sub-project facilities. These impacts are identified and assessed in details if IEE or EIA studies are conducted. If the sub-project falls under the 'exemption' category, then good engineering practices as discussed in ESR should be followed to mitigate the impacts.
- c. *Water pollution.* The sub-project may contribute to polluting the natural water bodies during the construction or operational phases; and there may be spoils generated during the construction stage, runoff from unprotected slopes, spillage and leakage from storage sites and machines, and domestic sewage from the temporary camps for workers. The sub-project activities may also lead to the establishment of new activities (hotels, industries, settlements) discharging additional waste which will need additional facilities or expansion of existing facilities for the treatment and disposal of waste.
- d. *Air and noise pollution.* Earthwork and activities such as rock-crushing will give off dust and vehicles used for construction activities will contribute to air and noise pollution. Direct effects of the dust could be hazardous to the health of the workers and residents adjacent to the project site. Careful management of construction sites, storage of construction materials, and mitigation measures such as water sprinkling could reduce the problem.

- e. *Instability, landslide and soil erosion.* Construction activities may trigger these problems particularly in the weak and vulnerable geological areas. The type, size, frequency, and location of the existing unstable areas or landslides are important information which could help to design the mitigation measures. As far as applicable, these problems should be avoided by selecting the sub-project sites with least risks, reducing the area of ground clearance, using bio-engineering measures, and controlling the speed and volume of the water flows.

- f. *Sensitive areas.* It is essential to know if the sub-project site falls under listed sensitive areas such as historical, cultural and archeological sites, national parks, wildlife reserves, wetlands and conservation areas, and areas containing sources of public water supply. Although RRRSDP has a major criteria of avoiding the projects needing EIA, an alternative option could be investigated if any sensitive area of local significance falls on the road alignment.

Annex X

ENVIRONMENTAL REQUIREMENTS OF FIVE RRRSDP SUB-PROJECTS

The following table provides a summary of environmental requirements of five sample core sub-projects, as per procedural requirements of the Government of Nepal (GON) and ADB.

Table : Environmental Requirements of the Five Sample Core Subprojects

S. No	Sample core-subproject under RRRSDP	GON's Procedural Requirement		ADB's Procedural Requirement	
		EPR	Approval	EAD	
1	Bhojpur-Manebhanjyang Section of Bhojpur-Ghodetar Road	IEE	MLD approval obtained	IEE	SIEE prepared for RRRSDP
2	Dundhejhari-Tikapur Rural road	IEE	MLD	IEE	
3	Beni-Pakhapani Rural road	IEE	MLD	IEE	
4	Kamidanda-Taldhunga Rural road	IEE	MLD	IEE	
5	Chandane Rural Water Supply Scheme	EIF	MLD	ES	

The results of EAs are reflected in the detail design reports and contract documents which highlights the recommended environmental safeguards required to manage and mitigate the risks. During the planning phase, DDCs will coordinate with the MLD, DOLIDAR and PCU to ensure that the project scale and size is as prescribed in the EARP report, and that all recommended mitigation measures proposed for this phase of the operation are incorporated in the design. DDCs will serve as proponent of IEE study and prepare the reports with a support from DIST. The MLD, DOLIDAR and the PCU will provide guidance to the DDCs in this matter by providing technical guidelines and standard formats.

During the construction phase, DDCs will coordinate with the concerned agencies and personnel to implement all mitigation measures and guidelines prescribed in the EARP and the environmental reports and Environmental Magement Plans (EMP) for the particular subprojects. The DDCs will be also responsible for engagement of independent third party as environmental monitoring consultants of the subproject during the construction phase.

Each individual IEE is expected to identify mitigation measures specific to the terrain of the area where the subproject is proposed, and also to the scale of each operation. RRRSDP has envisaged to apply a generic methodology by following ADB guidelines and GON procedures, which include impacts identification, analysis, planning and preparation of an environmental management & monitoring plan.

