

Government of Nepal
Ministry of Physical Planning and Works
Department of Roads
Geo-Environment and Social Unit

A Report on **2nd National Training Course on Landslide Risk Management**
under Asian Program for
Regional Capacity Enhancement for Landslide Impact Mitigation
(RECLAIM) Phase II
Kathmandu, Nepal (22nd -24th Dec, 2008)



Jointly Organized By



**Tribhuvan University
Institute of Engineering**



**Asian Disaster
Preparedness Centre**



**Department of Roads
Geo-Environment & Social Unit**

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1. Introduction

Disasters are of any nature or type or origin. Any country may directly and indirectly be affected by the disasters. Many of the disasters are not within the control of human beings. However, if we are prepared for the possible disasters, we can minimize the impacts. An increasing number of disasters and their effects on the economies have drawn the attention of the international communities.

The Asian Disaster Preparedness Center (ADPC) is a non-profit organization supporting the advancement of safer communities and sustainable development, through implementing programs and projects that reduce the impact of disasters upon countries and communities in Asia and the Pacific, by:

- Developing and enhancing sustainable institutional disaster risk management capacities, frameworks and mechanisms, and supporting the development and implementation of government policies;
- facilitating the dissemination and exchange of disaster risk management expertise, experience and information; and
- Raising awareness and enhancing disaster risk management knowledge and skills.

At the recommendation of UN Disaster Relief Organization (UNDRO) - now known as UN Office for the Coordination of Humanitarian Affairs (UN-OCHA) - ADPC was established in 1986 as an outreach activity of the Asian Institute of Technology in Bangkok, Thailand, with the aim of strengthening the national disaster risk management systems in the region. In 1999, ADPC became an independent entity, which is governed and guided by a Board of Trustees (21 members representing 15 countries) and advised by a Regional Consultative Committee (32 members from 26 countries) and Advisory Council (55 members from a wide range of agencies.)

ADPC's Vision, Mission and Goal

ADPC's *vision*

Safer communities and sustainable development through disaster risk reduction

ADPC's *mission*

ADPC's mission to reduce the impact of disasters on communities and countries in Asia and the Pacific by:

- raising awareness and enhancing knowledge
- developing and strengthening sustainable institutional mechanisms
- facilitating exchange of information, experience and expertise; and
- developing and demonstrating innovative disaster reduction practices

ADPC's *goals* are to:

- Mainstream Disaster Reduction in Development
- Build and Strengthen Capacity
- Facilitate Partnerships and Exchange of Experiences
- Be recognized as a Proactive and Responsive Regional Resource
- Achieve Quality Service Through a Team Approach

Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM)

Introduction

ADPC in collaboration with Norwegian Geo-technical Institute (NGI) has developed the program for Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM) with the idea of promoting a dialogue between decision makers and professionals about the theoretical and practical aspects and issues related to landslide hazard mitigation. The program activities were designed to be implemented in three-years involving national partners from Bhutan, India, Indonesia, Nepal, the Philippines, Thailand and Sri Lanka.

The project aims to build the national capacity on landslide disaster mitigation by

- Identifying cost effective methodologies and practices adopted by national partners
- Execution of Landslide Mitigation Demonstration Projects, (LMDPs) in 2 countries as a source of committing efforts and partly funds for applied mitigation, advocacy and awareness creation purposes.
- Through sharing of experience of partner agencies in target countries in Asia.

This project is done in collaboration with the Norwegian Geological Institute.

Activities for RECLAIM Phase II:

The fundamental basis for Phase II is to highlight the need for a gradual change in attitude towards proactive approaches of preventive measures to reduce losses. The regional implementing partners NGI and ADPC have demonstrated the ways of interactive training methodology and have stressed the need for continuity for actions as creating trust and changing attitudes cannot happen overnight. Attitude change is the primary challenge in order for behavioral change to occur subsequently. The curriculum outline for a national training course has been developed and a generic module and training material for national training is expected to be developed under the Phase II of the program.

The participants who had attended the 1st Regional Training in Sri Lanka highlighted the importance of undertaking demonstration projects (LMDPs) to enhance the knowledge and skills of local professionals on investigation, instrumentation and structural mitigation of areas identified to be landslide prone. Especially this is a very important aspect for human settlements threatened by landslides in terms of reducing the casualties and destructions due to potential events in future.

Therefore the program under Phase II would expand its scope and in size to provide hands on experience to professional staff attached to local partner agencies, while continue to provide a platform for having further interaction and discussions between decision makers, planners and professionals with theoretical and practical knowledge on the issues related to landslide risk minimization.

Participating Institutions:

Bhutan

- Department of Geology and Mines (DGM), Ministry of Trade and Industry (Lead Partner)
- Departments of Roads and Agriculture

India

- Indian Institute of Remote Sensing (IIRS) (Lead Partner)
- Central Road Research Institute
- National Disaster Management Division (NDMD), Ministry of Home Affairs

Indonesia

- Centre for Volcanology and Geological Hazard Mitigation Research and Cooperation Bureau
- Gadjah Mada University (GMU)

Nepal

- Geo-environment and Social Unit, Department of Roads (Lead Partner)
- Department of Water Induced Disaster Prevention (DWIDP)
- Department of Narcotic Control and Disaster Management, Ministry of Home Affairs

Philippines

- University of the Philippines (Department of Engineering Sciences at the UP College of Engineering) (Lead Partner)
- National Disaster Coordinating Council (NDCC)
- Department of Environment and Natural Resources (DENR)

Sri Lanka

- National Building Research Organization (NBRO) (Lead Partner)
- Road Development Authority (RDA), Ministry of Highways
- Disaster Management Center (NDMC)

Thailand

- Department of Mineral Resources (DMR), Ministry of Natural Resources and Environment (Lead Partner)
- University of Kasetsart
- Department of Disaster Prevention and Mitigation

2. Objectives of the National training course

Nepal being a small country with varied geographical setting is suffering from a wide range of natural as well as manmade disasters and mitigation of those disasters is a daunting challenge. Nepalese approaches specially in mitigating the landslide related disaster is well recognized by the international agencies and member countries of ADPC.

Since many disaster mitigation measures require regional efforts, it is quite beneficial to Nepal to join the international organizations such as ADPC. Considering these issues the Department of Roads (DOR), on behalf of Government of Nepal, has signed MOU with Asian Disaster Preparedness Centre (ADPC) on January 2007 A.D. Being a country partner of ADPC, Geo-Environment and Social Unit (GESU) of the Department of Roads has already made contribution to the centre in a number of ways particularly in sharing of experiences in dealing with various types of disasters. The DOR has participated in various regional forums and meetings organized by ADPC and presented papers on various aspects of disasters.

GESU of Department of Roads has already conducted three days "National Training Course on Landslide Risk Management" organized under Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM) Phase II, from June 18-20 in Sauraha, Chitwan; a beautiful tourist station in Nepal. The training was jointly organized by GESU and ADPC.

Since the three days National Training course conducted by GESU in June 2008 was success full, ADPC decided to provide additional fund to Nepal to conduct this **2nd National Training Course on Landslide Risk Management**, in the same year 2008.

The basic objectives of the present training are to provide:

- hands on experience to professional staff attached to local partner agencies,
- a platform for having further interaction and discussions between decision makers, planners and professionals with theoretical and practical knowledge on the issues related to landslide risk minimization.

3. Training approach

This 3 days program is basically to share experiences in some theoretical and practical aspects of landslide risk management. Field visit, identification of problems and their solution was also dealt in the course. The participants were taken to the site for field visit where the frequency of landslide and flood is high and the road section in this area is under the high risk of landslide and flooding. During the field visit, the causes of landslides and flooding were elaborated and discussed with experts. The functioning of different mitigation measures that were already implemented was observed and the present scenario of the site was discussed.

Altogether 8 papers were presented in the training course. There was a field visit followed by presentation on technical aspects, site specific problems and mitigation measures implemented at the site. Many sessions found to be very interesting and some resource persons were over taxed. Most of presenters were the experts and experienced officers of government of Nepal who have expertise as well as long experiences in landslide mitigation measures.

4. Training program and participation

This three days **2nd National Training Course on Landslide Risk Management** was organized in Babarmahal, Kathmandu; on DEC 22-24, 2008 (Paush 07-09, 2065). There were 32 participants from various government and nongovernmental agencies in the training. Appendix I depicts the list of participants and their organization. The detail schedule of the program is given in Appendix II.

5. Training highlights

A. Opening Session

The opening session of the training was scheduled at 8:45 AM on 22nd Dec, 2008. It was attended by Mr. Tulasi Prasad Sitaula: Director General of Department of Roads as Chief Guest, Mr. Baburam Bhattarai: Dean of Institute of Engineering as Chair Person, Mr. Hariom Srivastav: Deputy Director General of Planning and Design Branch of Department of Roads as Guest, other guests include Unit Chief GESU Mr. Ram Prasad Pathak, Unit Chief RSSDU, Mr. Dilli Raman Niraula, paper presentators and participants.



A view of opening session represented by DG/DOR and Dean/loE.



Chief Guest, DG/DoR, Mr. Tulasi Prasad Sitaula Inaugurated the Training.

Welcome and program highlight: Mr. Ram Prasad Pathak, GESU Chief

Mr. Pathak explained the vision and mission and activities of the ADPC and its members. He also mentioned the DOR need for signing the MOU with ADPC and outlined the progress made so far. Mr. Pathak also explained the objectives of the training and outlined the three days program.

Remarks: Mr. Hariom Srivastav: DDG/ P&D Branch of DoR

Mr. Srivastav outlined the achievement to be made by the program. Continuing his remarks Mr. Srivastav hoped that the outcome of the training will help the decision makers in developing and implementing more effective disaster mitigation measures. Finally, he thanked the GESU for making remarkable contribution in launching disaster mitigation programs in the country.

Views & key note: Chief Guest, DG/ DOR, Mr. Tulasi Prasad Sitaula

Mr. Tulasi Prasad Sitaula mentioned that the landslide disaster is one of the major problems of the department. "We have introduced number of measures for minimizing the frequency of disaster particularly related to the landslide and reducing the level of risk associated with the disaster. Geography of the country, road construction and landslide are strongly related issues: we have to construct roads in the hilly and mountainous regions which are prone to landslide and disaster. We are sure that the department is not solely responsible for such landslide. However we must use our professionalism in our works and this will definitely reduce the frequency of landslide and the level of risk. One of the major problems of the department is the limited manpower who has expertise in all areas related to the landslide" he added.

Mr. Sitaula reminded that the frequencies of such trainings by DoR are now increasing and requested participants to use this platform to share their experiences which will be very effective in introducing the mitigation measures to minimize the negative effects of landslides. He thanked all the agencies involved in this program particularly the ADPC and IoE. Finally, Mr. Sitaula wished for successful completion of the training.

Concluding Remarks & Closing of Opening Session: Chair Person, Mr. Baburam Bhattarai: Dean of Institute of Engineering

Mr. Bhattarai, at first, thanked the department for selecting IoE as an organizer. Mr. Bhattarai hoped that the training will suggest crystal clear measures to minimize the negative effects of the disaster caused due to land slides. The outcome of the training should be an unforgettable gift to the decision makers, he added. Finally, Mr. Bhattarai wished for successful completion of the training.

B. Technical Sessions

Just after closing of opening session, the technical sessions were started. In the first day four technical papers were presented. In the 2nd day, there was a field visit program. In the third day, the remaining four papers were presented. At the end of program there was a closing session.



A view of technical session

The major issues raised by the participants including suggestions and recommendations made during the technical session are summarized below:

- Geology and topography of a region are very much related to landslide, and therefore should be given due consideration while designing a road project. Each road project must have geologist/hydro-geologist.
- Prior to the construction activities detail assessment of the site (e.g. strength of rock, stability of slope) is very much essential.
- Initial study on the future stability of the road slope is justifiable.
- No full proof solution to landslide is available.
- Community needs practical training to minimize the level of risk due to landslide.
- Integrated policy on landslide and hazard management is essential.
- Hazard is a dynamic concept and is influenced by many factors: over time the extent of present level and nature of hazard changes.
- Construction of road is not the only cause of landslides in Nepal. The geology of the site, steep hills, heavy and uneven precipitation, cultivation on terraces and deforestation are some of the major causes of landslides in Nepal.
- Assignment of the Engineers must be based on their expertise for effective results.

B. Field Observations along Arniko Highway km 57 to km 89



A field visit was organized to Sector 2 of Arniko Highway (km 57 to km 89), where extensive geotechnical stabilization measures and river bank protection works were implemented during the Road Flood Rehabilitation Project during 1889 to 1993 under a World Bank financial assistance. The investigation, survey, design and construction supervision of those stabilization / mitigation measures were carried out by ITECO JV under an agreement with the Department of Roads and the measures were constructed by China Road & Bridge Engineering Company. The stabilization / mitigation measures have served as valuable demonstration and training material for various national and regional geotechnical training programs. Mr Tuk Lal Adhikari, who was involved in investigation, survey, design and construction supervision of those stabilization / mitigation measures of above mentioned road, described the scenario before, during and after the implementation of following stretches of road and described the performance of the structural mitigation measures applied for mitigation of landslide and floods on the Araniko Highway.

In general, the measures were successful as they have served satisfactorily for more than 15 years which is generally considered life span of such measures. Most of the applied measures were found intact and may very well serve for many years in future if necessary repairs / maintenance are implemented. In particular the following observations were made:

AH-1 (km 68.7 to km 69.3)

- Half width bridge was found intact.
- Gabion spurs were found intact. Some of the concrete blocks are displaced which need repositioning or addition of similar blocks interconnected with one another.

- Revetment cum retaining wall (composite construction: RCC up to 1 year flood, cement masonry up to 5 year flood and gabion up to 20 year flood) all along the length is intact.
- Concrete frame boulder packed apron is generally intact. Some critical sections show excessive distresses which needs urgent repair / strengthening.
- Concrete block aprons are functioning generally well. Two river side layers have moved excessively which need urgent attention to add similar blocks interconnected with one another.
- Horizontal drains at landslides are functioning satisfactorily. Some non-weeping ones need cleaning with high pressure jets.
- French drains are satisfactorily functioning.
- Bioengineering works are grown well.
- Local road is being constructed across the stabilized landslide. If proper precautions are not taken, it may adversely affect stability. Urgent coordination is required with local community to adopt environment friendly road construction practice.
- Catch drain at the up scarp area needs annual monitoring.



AH-2 (km 70.2)

- The applied measures such as bioengineering and structural measures are functioning well.
- Rock bolts are intact.
- Catch drain at top of slide needs annual monitoring.



AH-4 (km 72.5)

- Major revetment cum retaining wall with composite construction at Balephi is functioning well.
- Concrete block launching apron with four rows of concrete blocks interconnected with another in longitudinal and transverse direction by cable is functioning excellently.
- Gabion spurs are generally intact with some concrete blocks displaced from their initial position. The displaced blocks need urgent attention to add additional blocks and interconnection with existing blocks.
- Concrete block launching apron at upstream wall is found intact.
- The landslide stabilization works and road formation are intact. The gabion breast wall has developed excessive bulge, which needs strengthening / reconstruction in near future.
- The horizontal drains have ceased to discharge, which needs urgent cleaning.
- Bioengineering works applied at the slide area are grown well.
- The catch drain at the top of the slide needs annual monitoring and possible maintenance / repair.

AH-5 (km 73.5)

- The stabilization measures are generally serving well.
- Horizontal drains have ceased to discharge which need urgent cleaning with high pressure jets.
- Catch drain at the top of slide needs annual inspection and repair if needed.

AH-6 (km 78.3)

- The stabilization measures are generally serving well.
- Revetment cum retaining wall at river bank is generally intact.
- Some of the concrete blocks and armored boulders have moved, which needs additional blocks or boulders interconnected to existing boulders or concrete blocks.
- Bioengineering works are generally successful.

AH-9 (km 83.7)

- The toe wall at river bank has collapsed due to shifting of the Sunkoshi river as it is pushed towards right bank by excessive debris deposited at left bank fan.
- Because of failure of the toe structure the entire stabilized slope has bodily moved by more than 8m to valley side. The gabion wall, culvert and breached part of pavement are intact at displaced position indicating rigid body movement.
- Bioengineering measures are generally grown well at the displaced position.
- Horizontal drains and French drains have impaired and not functioning well.
- The condition of the French drains and catch drain at the top of the slide needs urgent monitoring.
- Further investigation and design of the stabilization measures is a must to ensure road operation during monsoon period.

AH-10 (km 84 to km 87)

- A new stretch near km 84.5 has failed at valley side making the road formation critical.
- Similarly, a long section between km 84.5 to km 85.5 is severely affected by large scale massive slide. The entire slope needs mapping and investigation.
- The stabilized slide at hill side at km 84.5 which was highly active during RFRP is generally intact. The catch drain at the top of the slide needs urgent monitoring and repair if needed.
- Another section near km 86 has also show large scale destabilization. The possibility of toe cutting by Bhotekoshi because of pushing of its flow to right

bank due to extension of Sunkoshi debris fan near confluence should also be investigated.

- The entire section needs urgent investigation for stabilization to ensure non-obstructed operation of the road.

C. Closing Session

The closing session was scheduled on 24th Dec, 2008. The session was Chaired by Mr. Megh Raj Dhital: President of Nepal Geological Society, Chief Guest of the closing session was Mr. Tulasi Prasad Sitaula: Director General of Department of Roads as Other guest included were: GESU Unit Chief - Mr. Ram Prasad Pathak, RSSDU Unit Chief - Mr. Dilli Raman Niraula, and the participants.

Participants' Observations: Dr Bijaya Jaisi, Engineer, DoR

On behalf of the participants Mr. Jaisi explained the achievement of the training. He mentioned that the "Participants were able to share the experiences and learned new approaches in managing the disaster mitigation measures. Papers presented by the resource persons were very relevant and were based on cases. This has further enhanced their understanding on the disaster mitigation and risk management. The general consensus of the participants was that the duration of the training should be extended and more case based papers should be included, he added. He expressed that the training was practical and has enhanced the skills of the participants in managing the landslide disaster mitigation measures Mr. Jaisi mentioned that the most significant aspect of the training was the field observation Finally, on behalf the participants Mr. Jaisi thanked the DOR for organizing such useful training course and hoped the continuation of the program in the future.

Certificate Distribution

The certificate was distributed by Mr. Tulasi Prasad Sitaula, Director General of Department of Roads and Chief Guest of the Ceremony. Sample of certificate is as follows:



Remarks by the Chief Guest: Mr. Tulasi Prasad Sitaula, DG/DoR

In his closing speech Mr. Sitaula congratulated the participants for their active participation and successful completion of the training. "Based on the comments of the participants I conclude that the program was very useful to the participants. Department has policy to continue the practical and useful programs. In fact the real success of any training or training lies on the extent of application of the learned skills in the field. He requested participants to apply the learned skills in the works of the organization. Finally Mr. Sitaula thanked coordinating team for successfully completion of the program.

Closing Remarks of the Chair Person: Dr. Megh Raj Dhital, President, NGS;

Mr., Dhital expressed his thanks to Department of Road for inviting him as a resource person and specially for providing the opportunity to chair the closing session. He was very glad to share his geological experiences from different road projects he has worked for, as a geologist, he added. He did not miss to use the platform to assure that as a president of the Nepal Geological society he was, on behalf of his organization, very keen to shake hands with the Department of Roads to solve the road side geotechnical problems. He finally concluded his remarks by thanking all the ones who were involved in this training either as organizers or as participants.

D. Photo session

Immediately after the completion of the closing session a photo session was held to capture all the organizers, trainers and trainees for future memory.



List of Participants and Invities

S.N.	Name of Participants	Designation	Organization	Email	Phone
1	Abhiman Das Mulmi	Engineer	DoR	adasmulmi@hotmail.com	9803483776
2	Badri Pd. Sharma	Engineer	GESU	badri@dor.gov.np	9841398899
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4	Bimala Devkota	Env. Off	GESU	Diwa.nishu@Yahoo.com	
5	Birendra Mahaseth	SDE	DoR	bmahaseth@yahoo.com	9741175544
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8	Chandra K. Subedi	Engineer	RoD	er.chandrasubediExa	5520339
9	Dilip sadeula	SDEG	DSCWM	dsadula@yahoo.com	9841331264
10	Dilli Raman Niraula	SDE	DoR	Sunita niraula@Hotmail.com	4262854
11	Dr. Bijaya Jaishi	Engineer	DoR	Bijayadr@gmail.com	9841376893
12	Ghana Shyam Gautam	Engineer	DoR	gsgautem100@gmail.Com	9841557555
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14	Govinda Prasad Wagle	Engineer	MoPPW	Waglegp@gmail.com	4211930
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18	Maheshwor Lal Shrestha	SDE	DoR		9851100195
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22	Prakash Man Shrestha	SD Engi.	DWIDP	pms-pks@yahoo.com	9841529244
23	Ram Prasad Pathak	SDE	DoR	rppathak@dor.gov.np	9841380652
24	Ramesh Neupane	Lecturer	IoE, Pulchowk	ramesh Neupane@gmail.com	6914591
25	Santosh Kumar Karn	Engineer	Butwal DRO		9741062598
26	Saroj Pradhan				9841444615
27	Shiva Raj Adhikari	SDE	DoR,BSBR	Sivarajadhikar@hotmail.com	9841466484
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29	Suman Ghimire	Officer	MOHA	sumanghimire@gmail.com	9741121521
30	Suraj Sigdel	SDE	DoR	Sigdelsuraj@yahoo.com	9841758966
31	Suresh Paudel	SDE	DoR	Suresh Poudel@Hotmail.com	9841404460
32	Trilok Chandra Bhatta	Geologist	NDRI	trilokbhatta@yahoo.com	9841426631
33	Tulasi Prasad Sitaula	DG	DoR		Invitees
34	Hariom Srivastav	DDG	DoR		
35	Baburam Bhattra	Dean	IoE		
36	Keshav Prasad Acharya	Adm Chief	DoR		
37	Tika Prasad Shrestha	Acc Chief	DoR		
38	Ram Bdr Khadka	Acc Officer	DoR		
39	Dhan Prasad Poudel	CED Chief	IoE		

PROGRAM SCHEDULE OF
2nd National Training Course on Landslide Risk Management
 Under

**Asian Program for Regional Capacity Enhancement for Landslide Impact
 Mitigation (RECLAIM Phase II)**

22-24 Dec 2008, Kathmandu, Nepal

Venue: SAP Falcha, Prasutimarga.

Monday, Dec 22, 2008

08:00-08:45 Registration & Break fast

08:45-09:45 OPENING CEREMONY/ Key notes

Chairing the session and calling on the dais	8.45-8.55	Dr. Baburam Bhattarai Dean, IOE,TU
		Tulasi Pd. Sitaula, DG,DoR Chief Guest
		Hari Om Sribastav DDG, DoR, Guest
		Dilli Raman Niraula Unit Chief, RSSDU Guest (DoR)
		Ram Prasad Pathak Unit Chief , GESU (DoR)
Welcome Speech	8.55-9.00	Dhan Prasad Paudyal Chief, CED, IoE
Highlight of training/Keynote	9.00-9.20	Ram Prasad Pathak Unit Chief , GESU (DoR)
Importance of the training speech	9.20-9.25	Hariom Sribastav DDG, DoR, Guest
Remarks from the Chief Guest	9.25-9.35	Tulashi Pd. Sitaula, DG, DoR Chief Guest
Highlight about IoE and conclusion speech of the ceremony	9.35-9.45	Dr. Baburam Bhattarai Dean, IOE,TU

- Master of Ceremony: Dhan Pd. Paudyal

09:45-10:00 Tea/Coffee Break

10:00-11:00 Geology and Climate of Nepal and Its Bearing on Infrastructure Development **-Prof. Dr. Bishal Nath Upreti**, Department of Geology, TU

11:00-12:15 Site Investigation Methods in Slope Instabilities in Nepal
Lecturer, IoE, Mr. Prakash Chandra Ghimire

12:15-13:15 **LUNCH BREAK**

13:15-14:30 An approach to sustainable management of road side slopes in Nepal
Dr. Madhusudan Acharya, Er. DoR

14:30-14:45 Tea/Coffee Break

14:45-16:00 An introduction to landslide stabilization works along Araniko Highway
Mr. Tuk Lal Adhikari, Managing Director, ITECO Consultant

Tuesday, Dec 23, 2008

07:00 A.M Departure from Department of Roads, Babarmahal; for Field visit (Araniko Highway)

(Break -fast and lunch on route)

Wednesday, Dec 24, 2008

08:30-09:00 Break fast

09:00-10:30 Retaining Structures along road corridor -**SDE. Naresh Man Shakya, DoR**

10:30-12:00 Landslide in Sindhuli Road -**SDE. Shiva Raj Adhikari, DoR**

12:00-13:00 **LUNCH BREAK**

13:00-14:15 A case study on vegetation-sliding mass interaction event: Can we use as an indicator to examine mechanism? -**Dr. Prem Prasad Paudel, DSCWM**

14:15-15:45 Engineering Geological Problems in Road construction- Examples from Nepal -**Dr. Megh Raj Dhital, Central Department of Geology, TU**

15:45-16:15 Closing ceremony

Chairing the session and calling on the dais	15.45-15-50	Dr. Megh Raj Dhital President, Nepal Geological Society
		Tulasi Pd. Sitaula, DG,DoR Chief Guest
		Dilli Raman Niraula Unit Chief RSSDU
		Ram Prasad Pathak Unit Chief GESU
Briefing for three days training	15.50-15.55	Dilli Raman Niraula Unit Chief RSSDU
Experienced from the Participant	15.55-16.00	Dr. Bijaya Jaishi
About overall Training	16.00- 16.05	Ram Prasad Pathak Unit Chief GESU
Certificate Distribution and Speech	16.05-16.15	Tulasi Pd. Sitaula, DG,DoR
Vote of Thanks	16.15-16.20	Dhan Pd. Paudyal CED, IoE
Conclusion Speech	16.20-16.25	Dr. Megh Raj Dhital

- Master of Ceremony: Dhan Pd. Paudyal

16:15-16:45 Hi Tea/coffee