DET KONGELIGE
UTENRIKSDEPARTEMENT

NGI

adpc

3RD REGIONAL TRAINING COURSE

ASIAN PROGRAM FOR REGIONAL CAPACITY ENHANCEMENT FOR LANDSLIDE IMPACT MITIGATION

(RECLAIM II)

Organized by
Asian Disaster Preparedness Center (ADPC)

In collaboration with
Norwegian Geotechnical Institute (NGI)
University of the Philippines (UP)

27 - 31 October 2008, Astoria Plaza
Manila, Philippines

Proceedings of the Training

Asian Disaster Preparedness Center

Bangkok

1.0 Background

Asian Disaster Preparedness Center (ADPC) in collaboration with Norwegian Geo-technical Institute (NGI) has developed the 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 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 several 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.

RECLAIM Phase II is currently being implemented over a period of three-years involving national partners from Bhutan, India, Indonesia, Nepal, Philippines, Sri Lanka and Thailand. The fundamental basis for the project Phase II is to highlight the need for a gradual change in attitude towards proactive approaches of preventive measures to reduce losses. The implementing partners NGI and ADPC together with country partners have demonstrated the ways of interactive training methodology and have stressed the need for continuity for actions.

The program includes three (3) Regional Training Workshops for target country members to come together and share their experiences, technologies and successes in landslide risk mitigation. The first training course was held in Bandarawela, Sri Lanka from 7th – 11th June 2005 under RECLAIM Phase I and the second regional training was held in Phuket, Thailand from 29th January to 2nd February 2007. The third training course was organized from 26th to 31st October 2008 in Manila, Philippines with the participation from eight countries namely India, Indonesia, Nepal, Philippines, Norway, Sri Lanka, Switzerland and Thailand. The University of Philippines, Diliman assisted ADPC in organizing this regional training course.

2.0 Objectives of the Third Regional Workshop

- To enhance the capacity of professionals involved in landslide risk management by promoting discussions to share experiences and gaps of landslide mitigation measures.
- To foster professional relationship among the regional institutions and organizations and thereby to provide platform for networking, communication and collaboration.
- To share the experiences, outcomes and gaps of the two pilot projects under RECLAIM Phase II. The methodology adopted in the pilot projects and process of risk assessment and community based mitigation interventions were given the priority in the sessions.
- To discuss the sustainability of landslide mitigation practices in different countries
- To analyze possible “adaptation” mechanisms for landslide disaster risk reduction to make application of technologically sound mitigation measures more cost effective

(Refer Annexure -1 for the Agenda of the Workshop)

3.0 Proceedings of the Third Regional Training Workshop

3.1 Inaugural Function

Opening ceremony was chaired by His Excellency, Hon. Ståle Torstein Risa, Ambassador of the Royal Norwegian Embassy of Philippines, Dr. Lorna I. Paredes, Vice Chancellor, University of Philippines Diliman, Hon. Corazon Alma G. De Leon, Vice Chair of ADPC Board of Trustee, Mr. Horacio C. Ramos, Department of Environment and Natural Resource of Philippines, Dr. Oddvar Kjekstad, Dy. Managing Director, NGI, Dr. Edwin G. Domingo, Asst. Director, Mines and Geosciences Bureau, Councilor Antonio R. Tabora Jr. of Baguio City, Mr. NMSI Arambepola, Director UDRM, ADPC and Dr. Rhodora M. Gonzalez, Associate Professor, University of Philippines Diliman. The Banragay leader from Bagui City where the pilot project was conducted along with the Baguio City officials were present in the inauguration to share their experiences of the project.

Dr. Lorna I. Paredes, Vice Chancellor, UP Diliman welcomed all delegates to the Third Regional Training Workshop under RECLAIM Phase II. Dr. Oddvar gave opening remarks and expressed his expectation of sharing experiences in landslide mitigation measures carried out in the member countries with special focus on Early Warning Systems (EWS) on landslides at both community and national levels. Mr. Horacio C. Ramos gave a keynote address on behalf of the Department of Environment and Natural Resource of Philippines. His Excellency the Ambassador, Hon. Mr. Ståle Torstein Risa highlighted the need for strong regional networks for landslide mitigation. He stressed on developing a methodology for better and effective implementation of landslide management projects. He appreciated ADPC, NGI and other institutions/organizations from member countries for their continued efforts in sustaining landslide mitigation measures. Councilor Antonio R. Tabora Jr. of Baguio City expressed gratitude for selecting Baguio as the pilot project location under RECLAIM II on behalf of the City Government and people of Baguio. He shared his experiences with landslides in Baguio and his commitment for supporting landslide management activities. Dr. Domingo in his address emphasized the importance and need for landslide management and mitigation. Mrs. Corazon De Leon expressed her gratitude on behalf of ADPC to Norwegian government for providing opportunity for such ambitious assignment. Mr. Arambepola explained the objectives of the workshop such as sharing experience and information to look for more suitable risk adaptation mechanisms, risk transfer mechanisms and best practices in the region in landslide risk mitigation. Dr. Rhodora M. Gonzalez concluded the inauguration by sharing her experiences of RECLAIM II Pilot Project and thanked the delegates and dignitaries for their participation and support.

Day - 1 (27th October 2008)

The first day focused on the natural disasters and environmental, social, economic and administrative challenges Philippines is facing in disaster mitigation with special focus on the case study of Cherry Hills and its historic landslide in 1999. Few of the main reasons behind the catastrophe which were discussed during the training were:

- The developer of the housing scheme had not obtained an environmental compliance certificate before construction

- Failure of the government authorities in implementing the laws and regulations effectively as well as a proper monitoring mechanism
- Poor early warning system
- Without having a proper evacuation mechanism and standard of living in evacuation shelters, inhabitants of Cherry Hills refused to evacuate which resulted in more deaths during the landslide.

The participants shared their similar experiences in their respective countries and suggested some best practices to minimize the effects of such disasters in future. Those suggestions were:

- "Risk Transfer" Mechanism – Establishment of a mandatory Housing Insurance scheme for such low-cost housing projects. Generally, insurance companies conduct thorough investigation of the land/house in order to decide the insurance premium which would help the developer as well as the buyers in assessing the possible hazards around the area. It was shared that this practice is widely being used in Hong Kong.
- Empower the community to make "informed decision". This empowerment can be as simple as information sharing, public awareness and assured livelihood activities to have a choice of residence or evacuate/relocate. It can also be a loan scheme with Government subsidy for the community which would enable them to select houses in a disaster safety area or build disaster-resistant houses for a higher price.
- Advocate for effective implementation of already existing policies (Land-use planning & zonation) mandating the developers to submit engineering geology certificate before they obtain Environmental Compliance Certificate
- Development of an effective mechanism to transfer scientific knowledge into community's understandable language. Information which are readily available in websites such as http://www.hlurb.gov.ph/ (Housing and Land Use Regulatory Board, Philippines) need to be communicated to the communities who have no access to facilities such as internet.
- Establishing a strong relationship between public and private sector will help to expedite rescue and recovery phase (this was a suggestion made through Baguio earthquake experience)

Day – 2 (28th October 2008)

Field Visit to Cherry Hills Landslide Area

Background

On August 3, 1999, after several days of continuous heavy rainfall, a landslide occurred in Cherry Hills Subdivision, San Luis Village in Antipolo City, 32 km east of Manila. It destroyed about 379 houses resulting in the death of at least 58 people. Several studies have been carried out to understand the cause of the landslide. The landslide was initiated by both natural and anthropogenic factors. 365 mm of rainfall for three days was found to be the last triggering factor for the landslide. However, all the studies were preliminary and mitigation measures have yet to be implemented to

stabilize the slope. Although the area has been declared as hazardous to landslides most of the residents returned to their houses because they could not afford to purchase new houses in another location.

The participants of the 3rd Regional Training Course of RECLAIM Phase II visited the Cherry Hills landslide site on the second day of the training. The visit was coordinated by Dr. Sandra G. Catane and Dr. Gil Cardiel, former Dean of Mapua Institute of Technology. After the visit, the participants discussed ways on how to manage the landslide risk. The participants were divided into three discussion groups – Group 1: Understanding the Cherry Hills landslide's failure mechanism, Group 2: Mitigation measures and Group 3: Socio-economic and political aspect of the landslide disaster, after which the moderators of each group presented their summary.

Group 1: Understanding the Cherry Hills landslide's failure mechanism

In the absence of data such as topographic profiles, geologic cross-section (pre- and post-landslide), engineering geologic map and geotechnical data, the group could not fully assess the failure mechanism of the Cherry Hills landslide. However, based on the papers presented by the Filipino participants and the site inspection it was decided that the slope could still be unstable and prone to failure due to the following factors:

- rocks have low strength (composed of siltstone and fine sandstone which are poorly lthified and poorly cemented), highly fractured and saturated
- slope is too steep
- rocks are saturated

Estimated volume of potential landslide is approximately the same as the 1999 landslide (100,000 m^3). Retrogressive failure could occur at about 20m from the present scarp. Similar to the 1999 landslide, future landslides will behave like a soil failure due to very low rock strength.

Group 2: Mitigation measures

The mitigation measures proposed for possible future landslide in Cherry Hills included the following stages:

1. Investigation	• Preparation of a base map including engineering geological parameters, contours (1:500 scale) • Geotechnical investigation – soil parameters, determine the slip surface, subsurface geology and hydro-geologic conditions (e.g. groundwater fluctuations)

2. Mitigation	• Surface drainage system development • Trench drains or sub-surface drains • Vertical drains to get the water out • Horizontal drains • Vegetation by planting of grass and other bio-engineering methods • Cement shot-create for steep cut • Fencing-type walls to prevent the movement of the landslide mass towards the settlement area Other recommended mitigation measures include: 1) settlement or human activities should be prohibited 2) slope should be re-shaped to avoid stagnation of water and prevent water being entered to the slide area.
3. Monitoring	Constant monitoring of the area should be carried out in order to predict future slides
4. Early warning	If the mass is moving, install an early warning system, e.g. extensometers connected to a siren.

Group 3: Socio-economic and political aspects

The group discussion was presented under the following themes:

A. UNDERSTANDING THE COMMUNITY

Following characters of the community were identified in assessing the social and economic vulnerabilities and causes for continuity of stay in the vulnerable location.

1. Low-cost housing and therefore affordability for moving in to more safer areas
2. Good transportation/ access to transportation
3. Service-class people; largely dependent on Manila city
4. Ignorant about current hazards
5. Multiple hazards in prevailing in other areas

B. LEGAL ISSUES, BUILDING BY-LAWS DEVELOPMENT CONTROL

Following connected reasons have been identified by the participants

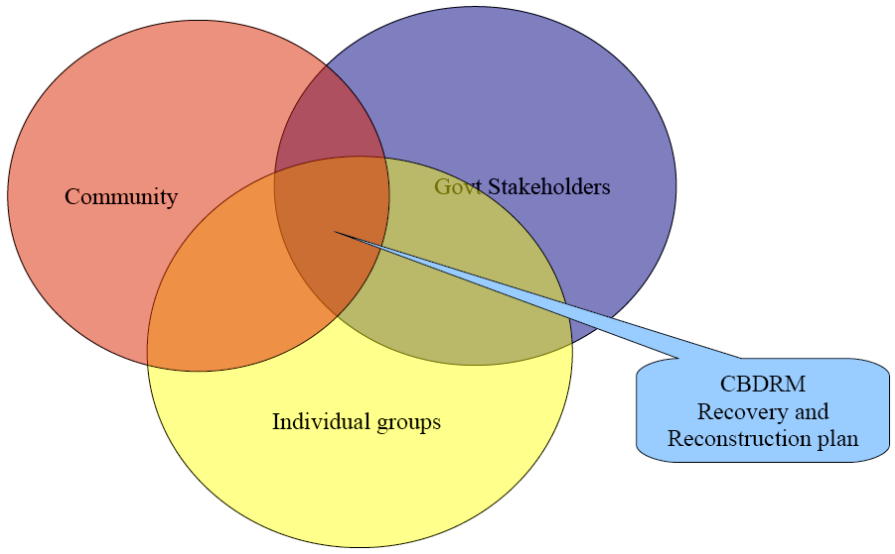
1. Poor land-use planning
2. Weak approval practices of building sites
3. Corruption of responsible authorities
4. Lack of strict legal framework for development control
5. Require investigation of sites for construction development
6. Less opportunity or discouragement of housing schemes
7. lacking proper monitoring system of development
8. Housing cooperatives enactment

C. RESETTLEMENT PROBLEMS

One of the reasons of many fatalities during the historic landslide in Cherry Hills was that the settlers refused to evacuate even after early warning due to many resettlement issues. The community had raised their concern about not having proper evacuation shelters, assured livelihood options in post-disaster phase and other related social and economic issues.

It was made clear by the Filipino participants, that this community does not have any alternative options for resettlement in a location which is closer to Manila and economical as Cherry Hills and which is also hazard-free area. Corruption of the government institutes are encouraging the low-cost housing projects by private developers to seep through the legal requirements. Therefore, without any alternative, poor are continuing to reside in hazard-prone areas.

Community-based mechanism for implementing a resettlement plan



D. Recommendations for reducing the risk in areas similar to Cherry Hills:

1. Creating awareness about impending dangers to community/local government/ financial institution to reduce the disaster risks.
2. Strict implementation of building by-laws, development control, and land-use planning.
3. Precise hazard, vulnerability, and risk mapping.
4. Sharing hazard-based database in public domain.
5. Precise demarcation of surrounding hazard-making area.
6. Risk transfer tools being awarded to community, stakeholders.
7. Regular consultative meetings.
8. Evaluation of structural and non-structural measures.

Day - 3 (29th October 2008)

Day 3 was devoted to share the experiences of RECLAIM II pilot projects conducted in Patong, Thailand and Baguio City in Philippines as well as to share the advancements in landslide risk management in the participant countries.

University of Philippines, Diliman from Philippines and the Kasetsart University of Thailand were the implementing partners of the pilot projects in the two countries.

The main objective of demonstration projects was to demonstrate the concept of investigation, instrumentation, and structural mitigation of a landslide-prone area in the Philippines and Thailand

- That may help build a GIS database for continuous monitoring of critical slopes;
- That may help to better understand the mechanics of impending landslides;
- That may obtain the synergistic cooperation of the stakeholders in living amidst natural hazards;
- That may serve as a basis for replication in other landslide vulnerable areas.
- To demonstrate implementation of a landslide mitigation practices
- To develop guideline for Monitoring/warning system
- To campaign with information material about landslide hazard
- To practice community based early warning
- To undertake awareness building activities for the city to reduce future events

The two projects in the two countries have taken different approaches in implementing the project. The Philippines project had much of CBDRM face to it where the communities participated from the inception of the project while the Thailand project took more scientific approach in analyzing and developing maps and mitigation measures and working with city authorities. Therefore the two projects had different learning, experiences and challenges. For example, the Philippines project had less scientific data in the maps compared to the Thailand project but had full support from the community because they owned the process of developing the maps and mitigation measures. Thailand project had to face objections from the communities since they did not want to see their residential area in “red” color or “yellow” color which is indication of a high risk or low risk. High risk zones identified by the scientific analysis of data have been presented to the city authorities and communities living in the respective areas to obtain the support of

- City authorities to regulate the development in high risk areas.
- Communities to reduce measures which increases the risk level

The experience sharing of pilot projects was followed by a discussion on National Training events conducted country partners under RECLAIM II. The participants discussed the challenges as well as solutions for those challenges they faced in organizing trainings on landslide risk management.

- Selection of participants is very important in deciding training programs. The organizer should select participants from all the stakeholders.
- Site-specific history on disaster risks is very important. Therefore, the participants appreciated the Landslide Inventory Form developed by the University of Kasertsart, Thailand under the RECLAIM II Pilot Project to gather disaster history of Paton City.

- Information and knowledge sharing and dissemination are very important. It was discussed that the role of the participants of 3rd Regional Training of RECLAIM II is to disseminate and share the information/knowledge they obtained during the training workshop.
- There should not be a "blueprint" of conducting the training. Different approaches should be taken depending on the participants and circumstances. For example, if it is an urban community, media would have a wider and more effective coverage in delivering the message whereas in a rural setting, workshops, training sessions will achieve the purpose.
- There is a need to convert scientific knowledge into community-understandable language in order to maintain the sustainability of disaster risk mitigation measures.
- The purpose of conducting training should be clearly defined and that purpose/objective should be clearly communicated to the participants. One of the main purposes of national training is to share information/knowledge on disaster risk mitigation throughout the country. For example, Manila authorities should know what activities are going on in Baguio city with regards to disaster risk management.

After lunch break a discussion on the advancement of landslide risk management in the participant countries was conducted. All the countries represented in the workshop did 10 minute presentations with special focus on recent disasters, national initiatives in prevention/mitigation, international initiatives and challenges they are facing in conducting mitigation measures.

Discussion points are summarized as below:

- Use of remote sensing data to develop base maps and then use real time field data for verification/validation
- Training communities to read early warning signs and evacuate their villages
- Issue of *False alarm* and community losing trust on EWS was considered to be one of the main barriers in risk mitigation measures. However, community participation and creating awareness among the communities on the risks in their community was found to be the best solution for false alarm.
- Different phases of management, assessment, evaluation
- Understanding the area prone to landslide is very important because it is crucial to learn how dangerous it is. This would encourage proper land-zonation and land-use management. The information gathered should be disseminated to the government and the communities
- Universities can cooperate with the government in preparing the hazard maps and use of technology
- Validation and verification – these methods have evolved in EWS – process based understanding to validate

Two presentations on comprehensive research from West Java on "rainfall induced landslides" and from Switzerland on "factors which trigger rock falls" were conducted by two participants. This included:

1. Factors governing landslides, which includes rainfall, geological features, human intervention
2. Flash flood phenomenon in Indonesia
3. Rock fall events, their triggering factors,

4. state of the art Techniques for assessing the triggering of landslides using radar technique and other electronic instruments

Recommendation

1. There is a need of involving advance state of art for understanding and estimating triggering of landslide
2. more intense field and research tie ups for understanding landslide event
3. application of high technology for understanding landslide event

Day – 4 (30th October 2008)

The fourth day was allocated for discussions on Future Challenges in Undertaking Landslide Preparedness and Mitigation Measures in the Asian Region and EWS experiences. The discussion points are summarized below:

- There must be an effective coordination mechanism between Government Agencies, NGOs & INGOs and the communities in order to achieve disaster risk mitigation.
- A good network of stakeholders is necessary to exchange resources and technologies
- Accurate maps and spatial databases are critical for decision-making, risk identification, mitigation and site specific interventions. There should be inter-agency coordination in sharing databases and methodology among various agencies.
- Presently access to information and data is a barrier which should be conquered to invent proper technologies and make good decisions on disaster mitigation measures.
- Lack of existing landslide inventories, local expertise to analyze existing data and less funds are the major challenges faced by many countries.
- There is a growing need to convert the scientific knowledge to layman terms. Scientists are lacking the knowledge how to communicate their scientific analysis to the communities living in hazard-prone areas and the communities have some reluctance in accepting these scientific data. Therefore, there is a huge gap in communicating the potential risk on time (early warning) in order to mitigate the impacts of a disaster.
- Communities need to be made conscious that disaster preparedness is the best mechanism to overcome threats.
- Simple early warning system which can be operated by the communities need to be provided. This will empower the communities as well as provide warning in adequate time.
- There should be policies and relevant mechanisms to safeguard livelihoods of disaster-prone communities before introducing them to EWS and relocating. Without the livelihoods are being addressed, the communities refuse to cooperate in disaster mitigation activities
- More focused research is needed to identify location & climate specific hazards and the funds needed to mitigate the disaster risks
- DRR should be part of local government policies and technical awareness such as GIS should be introduced to local government institutes and authorities
- Sustainable development and DRR are needed to be integrated and implemented effectively (awareness of land-use and zonation maps to be given to the local planners and engineers)
- Disaster management committees needed to be established at district levels covering broad

range of professionals such as engineers, geologists, development workers, community leaders, decision-makers, politicians etc.

- Information gathered by researchers and universities regarding disasters should be disseminated properly to all the stakeholders. This will enhance public knowledge and would be easy to get their consent in disaster mitigation activities
- Proper maintenance and monitoring of already existing mitigation-measures is needed
- Since landslide is localized event, not much focus is given by administration with respect to warning. The importance can be created through systematic awareness in local government, community, and other stockholders.
- Most of landslides are triggered by the rainfall. Thus, coordination of rainfall and its potential threat to cause landslides to be studied through geotechnical, geological and structural investigation. Symptoms of problem should be established and communicated.
- A network of rain gauges in landslide prone areas should be established. If existing, it is recommended to be reviewed. The cost effective tools, equipments and networks should be established for early warning system. One such effective early warning system is the Mr. Early Warning and Mr. Watching Network in Thailand. Mr. Watching Network is a group of volunteers in the communities in Thailand who are trained by DMR to read rain gauges established in hazard prone areas. They give the levels of seriousness of the probable hazard to Mr. Early Warning who is a community volunteer trained by the DDPM. Mr. Early Warning will give the alert warning to the community based on the information he gets from the Mr. Watching Network.

Day-5 (31st October 2008)

During the session on creating awareness, advocacy and strategies for risk communication policies, the discussion revolved around the involvement of media, government and the community. Mass media was seen as one of the best and effective communicating mechanism in creating awareness as well as advocacy of DRR. It is important to develop partnerships with the media to get their increased involvement in disaster mitigation measure and mainstream DRR into the goals of media agencies. This can be achieved through engaging media in various DRM activities which would render them commercial benefits as well as invoke their corporate social responsibility.

The best mechanism to achieve DRR in preparedness, response and relief is to mainstream DRR into government policies and programs. In order to achieve this goal, the government agencies and officials need to be educated and advocated for DRR policies by providing guidelines in drafting new legislations which mandates the enforcement of DRR mechanisms.

The other stakeholder to be educated and made aware is the community. This can be achieved through community involvement in development and DRR projects from its inception. Communities need to be involved in every project, activity carried out in their community which would affect their lives and their rights. DRR education needs to be streamlined in the education system to educate the children who are proven to be one of the best messengers of disaster preparedness.

During the final panel discussion, following guidelines were identified to avoid building in high risk landslide prone areas:

1. Geological maps and geotechnical investigations with technical data and scientific analysis should be used to identify landslide risk areas
2. Based on the scientific analysis location specific suitable land-stabilization measures should be identified, analyzed and developed
3. After stabilization of the area, the building construction design should be with strict supervision by the designer and technical organization enforcing the law and government regulations. In this case, building codes should be strictly followed
4. Any development or construction of a particular land should strictly adhere to land-use planning codes, regulations, policies or guidelines
5. Proper and effective monitoring of the construction should be closely conducted throughout the construction phase

Design Considerations

1. Deep foundation into the bed rocks or firm soil
2. Analysis on Cost effectiveness should be carried out
3. Additional load and pressure should not be given to the landslide area or it should be minimized as much as possible

4. Closing Ceremony

After five days of discussion, experience sharing and learning, the participants expressed their gratitude to the organizing team of ADPC and NGI for this opportunity of networking among the regional stakeholders. As a concluding discussion for this training workshop the delegates discussed several suggestions for upcoming RECLAIM phase III. These suggestions were finalized as a Declaration at the conclusion of the training workshop.

5. Recommendations

- The need was felt for extension of the project. The member countries felt that the more community based projects for land slide management to be implemented
- The common consensus was made on developing common methodology for landslide management
- The focus should be made on areas which have not been covered adequately during the past years such as early warning, methodology for developing threshold limits for initiation of landslides, landslide early warning in earthquake prone areas etc. The extensive experience of NGI experts can be shared with participants from Asia for making the sessions more interesting to the participants and NGI experts where possible should be invited to attend the National training events
- The approach for project implementation should be clearly defined in advance.
- Member countries should be increased.
- Focus should be on to foster institutional networking and communication.

- More field visits to the member countries and learn form each other.

6. Snapshots of the workshop