THE BEST PRACTICES FOR LANDSLIDE RISK MANAGEMENT IN THAILAND

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Introduction

1) Laplea/ Thapla, Uttaradit, 22 May 2006
2) Nam Pad, Uttraradit, 9 Sep 2011

1) Mae Rim, Chiang mai, 1 July 2016
2) Prao/ Mae Rim/ Mae Cham/ Hod, Chiang mai, 23 May 2017

Klongmui, Viphawadee, Suratthani, 11 Dec 2008
Khanom, Nakhon Sithamarat, 4 Nov 2010
Bunnagsatar, Srisakhon, Pattahni, 6 Nov 2009

May 2006
Uttaradit/ phrea/ Shkhothai was affected,
83 people death, loss 308 billions bath

November 2010
2 districts of Nakhon sithamarat was affected

March 2011
Krabi / Nakhon sithamarat was affected
14 people death, loss 10,000 millions bath
Landslide in Thailand

May 2017
11 districts of Chiang Mai was affected
213 people death,
111 people loss

July 2018
Bo Kluea, Nan was affected
8 people death

September 2018
Sob moei, Mae Hong Son was affected
7 people loss

Disaster risk management cycle

- Government agencies (DDPM)
- Local authorities

Disaster Risk Reduction
- Prevention and Mitigation
- Preparedness
- Rehabilitation and Reconstruction
- Response Relief

- Recovery
  - Build Back Better and Safer

Emergency Management

1 Introduction

- Academic sectors
- Government agencies (DMR, DGW etc.)

- Government agencies (DDPM)
- Local authorities
- Academic sectors
Landslide risk assessment applied by DMR

The RS, field investigation and GIS techniques were used for analyzing and modeling to delineate and categorize landslide susceptibility areas.

- **Logistic Regression model**: there are 54 provinces out of 77 provinces having landslide prone areas.
- **Frequency ratio model**: Presently, 12 provinces put of 54 provinces have improved susceptibility map.

The model based on the observed associations between distribution of landslides and each landslide-related factor.
GIS Analysis (Susceptibility model)

\[ LSI = \sum Fr_n \]

Where, LSI is Landslide susceptibility index
Fr is rating of each factor’s type or range
n is number of factors
Landslide risk assessment

According to the study there are 54 provinces out of 77 provinces having landslide prone areas.

Presently, DMR have improved landslide susceptibility map in 12 provinces out of 54 provinces in landslide prone areas.
Provide basic information for the community

Community Level Landslide Risk Map (scale 1:10,000)
- Landslide susceptibility area, risk area
- Location of local community-networks
- Important public place (school, hospital, temple, etc)
- Evacuation place

Since 2012, DMR have provided Community Level Landslide Risk Map of 940 tambols out of 1,084 tambols.

Community-based geo-hazard warning networks

DMR implemented a community-based volunteer training program which focuses on creating safety awareness and building a robust community warning network for geo-hazard (especially, flash flood and landslide) prone areas especially in village level.

The main aspect of establishing the Local watch networks for landslides

To minimize damages and to teach people in risky areas how to prevent themselves from disasters

Setting up local networks
Important: follow local cultures

1. Who to contact first?

2. How to distribute information?

3. How to raise awareness?
Providing training course
- Geology of the area
- Landslide susceptibility, hazard and risk potentials

DMR staff contact the head of village and ask for villager who will be the volunteer.

Example of evacuation map created by local community.

Discussing on landslide matter with local people and they are compiling their own early warning and evacuating plans.
Community-based geo-hazard warning networks

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DMR's staff cooperating with local people to search for appropriate observatory site (upstream area, near river flowing to the village)

Installing Simple Benchmarks

Identification of “safe place”, or shelters for evacuation during landslide events, e.g. temples or schools
DMR has distributed rain gauges to the networks as a simple tool of landslide early warning.

Presently there are 35,000 volunteers working as networks in 51 out of 54 provinces in Thailand.
Community-based geo-hazard warning networks

Flowchart of Warning System

- Disseminate Watch Bulletin (heavy rain)
- Catch signs of landslide
- Rainfall monitoring
- Stream monitoring
- Village speakers & Sirens

DMR

Head of village

- Informed by phone, SMS, mobile app.
- Inform

Relevant agencies

Warning

Inform down stream village

To maintain the community networks,

- Provide repeatedly training program for practise early warning and evacuation process every 2-3 year.
- Update the network data such as contact, address, and status.

Provide work practice on early warning and evacuation process by simulating a disaster situation in operation room for local people.
To support the networks, DMR established The Geohazards Operation Center, GOC in the head office to monitor geo-hazard triggering.

Example: Monitoring the weather condition (precipitation) by using data from concern agencies and from the networks in risky area integrated with hazard and risk map to disseminate landslide early warning to the network.

Geo-hazard monitoring system

DMR will disseminate watch bulletin to many sectors as follow:

- Mass media
- Disaster Prevention and Mitigation Regional Center
- Provincial Information Center
- SMS and mobile application to the community networks
DMR has installed 25 landslide monitoring stations including rain gauges, inclinometers and piezometers in Northern and Southern Thailand for landslide monitoring and early warning.

Investigate disaster areas

After disaster DMR sends geologist and surveying team to investigate the affect, to identify causes, to evaluate the geo-hazard reoccurrence, and to give a recommendation for mitigation measurement to the local authority.
Conclusion and recommendation

1. To cope with the geo-hazard in Thailand, DMR has conducted risk assessment and mapping, constructing public awareness to community by establishing community-based geo-hazard warning networks, enhancing Geo-hazard monitoring system, and provide an impact assessment and evaluation

2. There are some problems in Geo-hazard management in Thailand as the following;
   - Difficulty in cooperation between organizations related to geo-hazards (i.e., budget, personnel, and material)
   - Data and information on the areas at risk from each type of hazards are currently not available for the whole country

Thank you very much