

Overview of landslide management in Thailand

Siraprapa CHATPRASERT

Department of Mineral Resources (DMR),
Ministry of Natural Resource and Environment, THAILAND



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1. Introduction.

Thailand is located at the centre of the Indochina peninsula in Southeast Asia.

The total area is approximately 518,000 km².



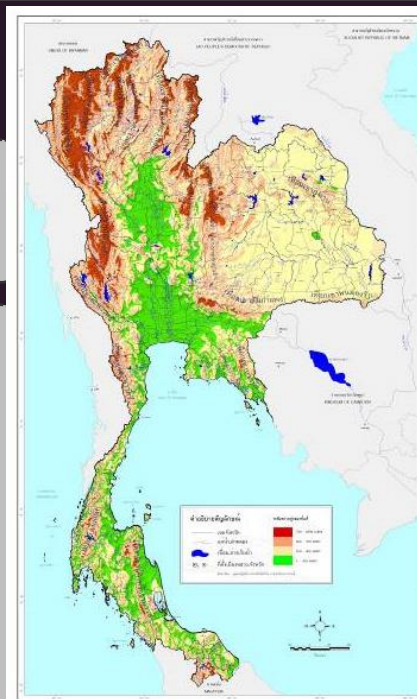
5° 37' N and 20° 27' N and longitudes 97° 22' E and 105° 37' E

1. Introduction.

Thailand is divided into 76 provinces which are gathered into 5 regions by location.

Geomorphology

- Northern: high mountainous area
- Central: flat plan with high mountains at the border
- Northeastern: plateau
- Eastern: hilly area
- Southern: shorelines and high mountains in the middle



2. Geohazard in Thailand

Coastal erosion

mostly occurred in coastal area along the Gulf of Thailand,



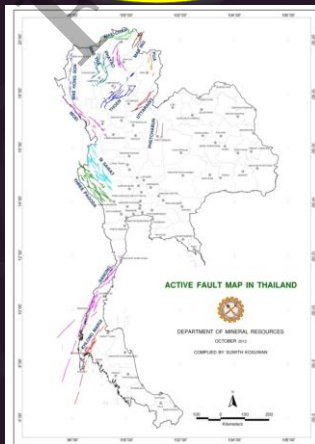
sinkhole

mostly occurred in Southern part where the area underlain by limestone, carbonate rock, salt beds



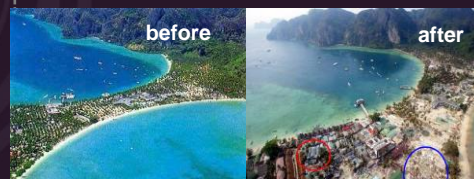
2. Geohazard in Thailand

Earthquake



Tsunami

The earthquake of 9.3 Richter at the NW of Sumatra on 26 Dec 2004 triggering the tsunami that hit Andaman sea coast, causing death & destruction (>5,000 people died)



Damages along Phi Phi island, Krabi

2. Geohazard in Thailand

Landslide



Petchabun Province on Aug 11, 2001



Mea Hong Son province on May 22, 2004

It generally occurs in high mountainous areas.

It is mainly debris avalanches, gully erosions and earth flows



Uttaradit province, and phrea province on May 23, 2006



Krabi province on March 29, 2011

Main factors contributing to landslide

Geology

Degrees of rock weathering play very important role in ranking the landslide potential

Rock type	Landslide potential
Limestone, dolomite	Low
Quartzite, sandstone	Middle
Shale, Slate, Phyllite, Schist	High
Granite, Gneiss, Volcanic	Very high

Topography

- Slope >30%
- Slope aspect
- Elevation



Land-use

- Deforestation
- Slope cutting



Heavy rainfall

Heavy rainfall from tropical cyclone or monsoon is a trigger

3. Landslide mitigation and prevention

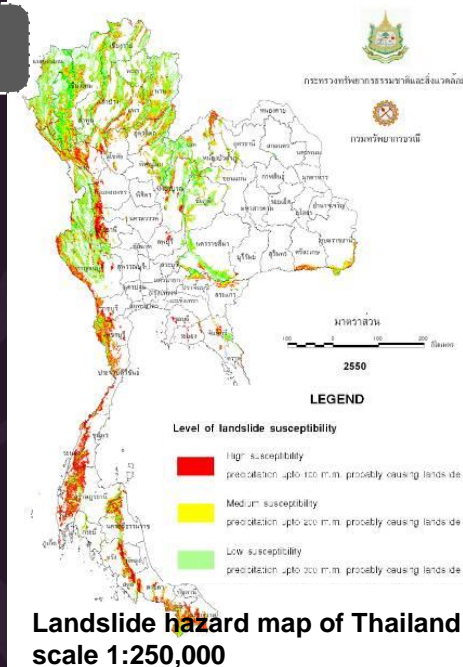
To cope with the landslide disaster in Thailand, DMR has conducted

1. Landslide Hazard and Risk Mapping to identify the dangerous areas.
2. **Establishing community-based landslide warning networks :to educated people in risk area how to prevent the disaster by themselves.**
3. Landslide Information Supporting via Geohazards Operation Center in term of monitoring and coordinating.
4. **Landslide Investigation to identify causes and factors.**

Landslide Hazard Map

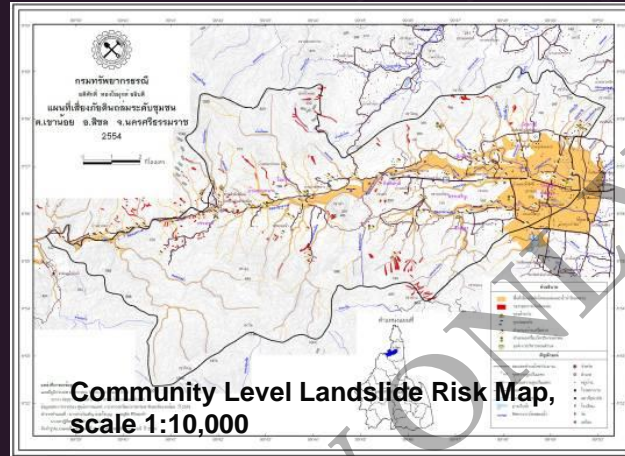
➔ The mathematical model (Logistic Regression Equation Method) was used to generate landslide susceptibility maps of the country.

➔ For the whole country, there are 6,563 villages in 54 provinces having landslide prone areas.

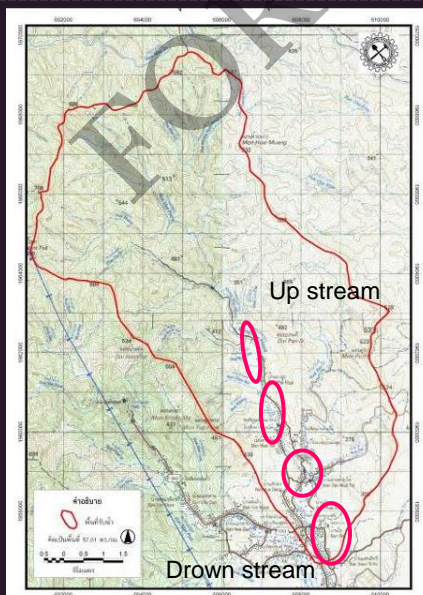


Landslide Risk Map

➡ **Covering Subdistrict area, showing the areas prone to be affected areas, landslide scars, network locations and evacuation places.**



Community-based landslide warning networks



Network Establishing

- 1. Investigating risk houses which are located in the same catchment.**

Community-based landslide warning networks

2. Persuasion to people living in the risk area to be volunteer groups for disaster caution, holding a workshop for training and hearing of their opinions on geohazard matter to point out risk potentials, to encourage people in disaster preparedness and to boost up awareness.



Local people are compiling their own early warning and evacuating plan.



Cooperate with DMR staff to search for appropriate observatory site + safe places

Community-based landslide warning networks

3. DMR also distributes rain gauges to the networks as a tool of landslide early warning.



Rainfall criteria

ฝนสะสม 300

Preparing for evacuation
(rainfall accumulation > 300mm)

150 - 200

Preparing for evacuation

100 - 150

Alert for landslide watch and
DMR networks on duty

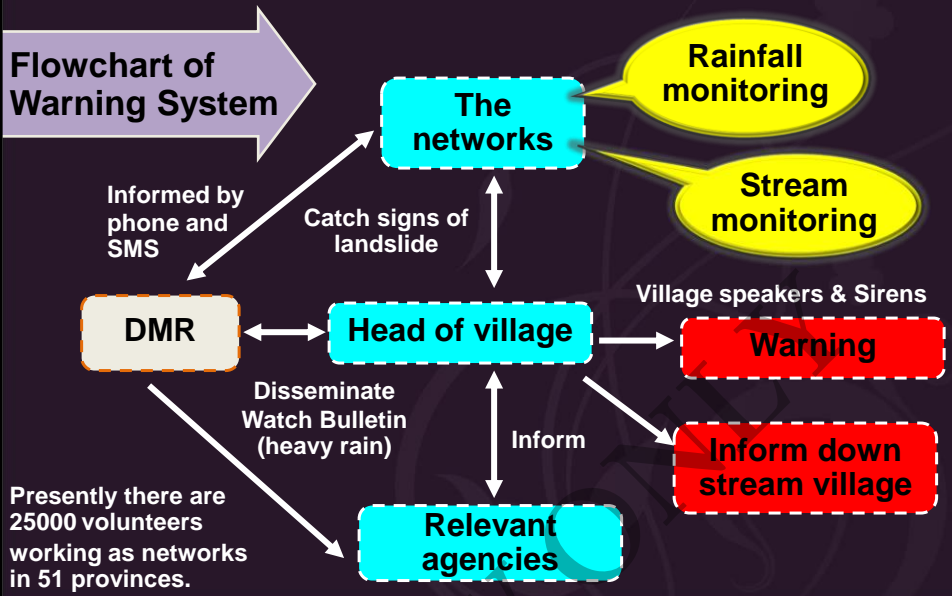
50 - 100

Alert for flooding

0 - 50

Normal situation

Community-based landslide warning networks



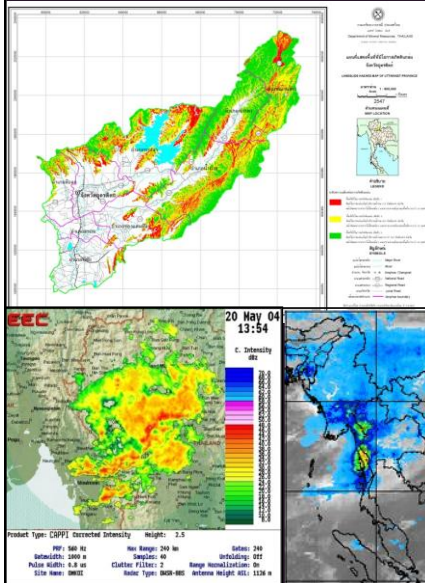
Landslide Information Support

To support the networks,

- ➔ DMR established The Geohazards Operation Center, GOC in the head office to monitoring weather condition especially heavy rain by using data from Thai Meteorological Department and from the networks in risk area.



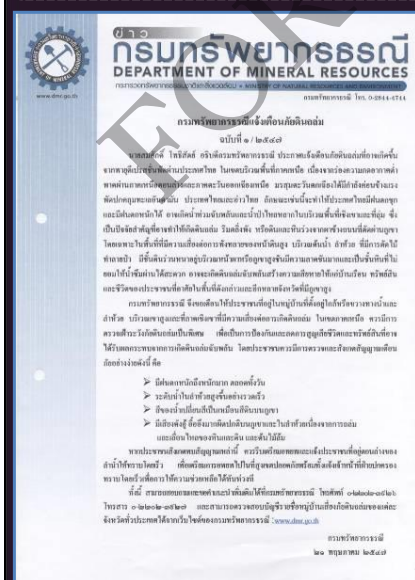
Landslide Information Support



Landslide watching guidance

- Radar Image and MTSAT-1R was use for observing cloud density and estimate the precipitation.
- Landslide hazard map and weather information was evaluated in order to disseminate warning message to the risk area.

Landslide Information Support

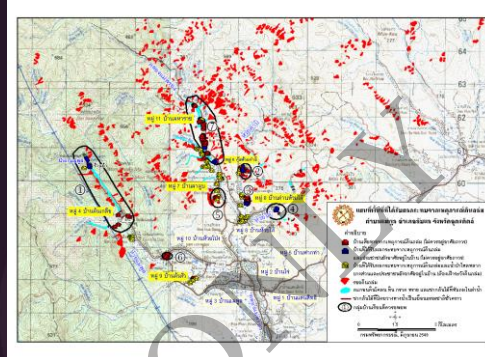


DMR will disseminate watch bulletin to many sectors as following

- ➔ T.V. , Radio
- ➔ Disaster Prevention and Mitigation Regional Center
- ➔ Provincial Information Center
- ➔ Chief of Province/District
- ➔ SMS to the DMR's networks

Landslide Investigation

➔ After incident DMR sends geologist team to investigate landslide effect , to identify causes, to evaluate the possibility of landslide, and to recommend basic mitigation measurement to the local authority



Landslide scar were interpreted from Image (after disaster)

THANK YOU VERY MUCH

Department of Mineral Resources,
Ministry of Natural resources and Environment,
THAILAND
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