

 **The Project on Capacity Development  
in Disaster Management in Thailand (2007-2008)** 

**Working group II: Hazard map and GIS database**

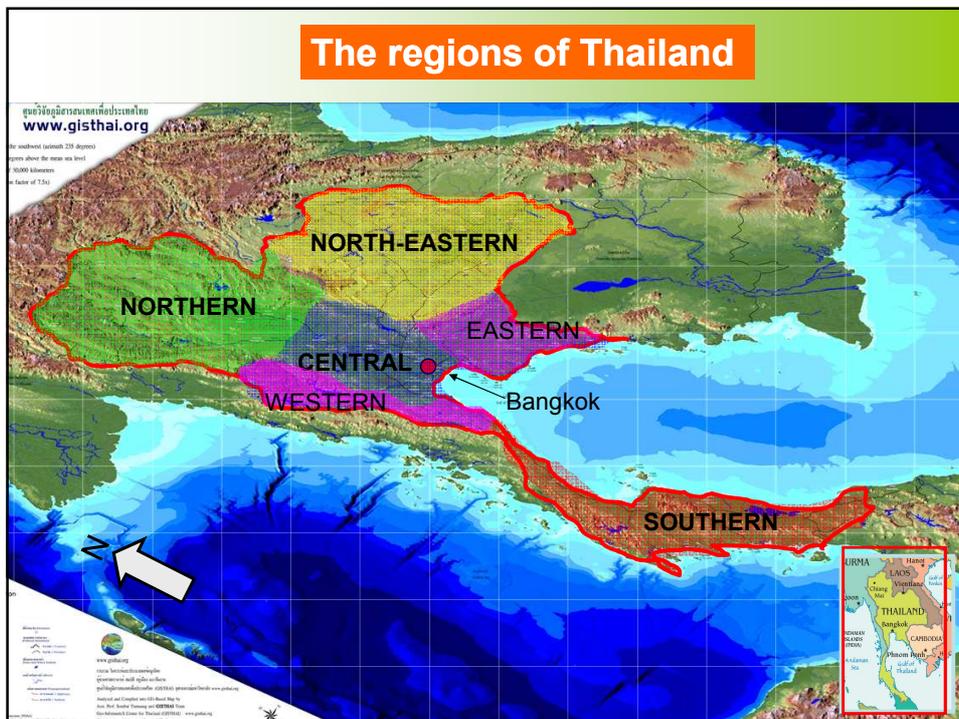
**FLOOD**

**&**

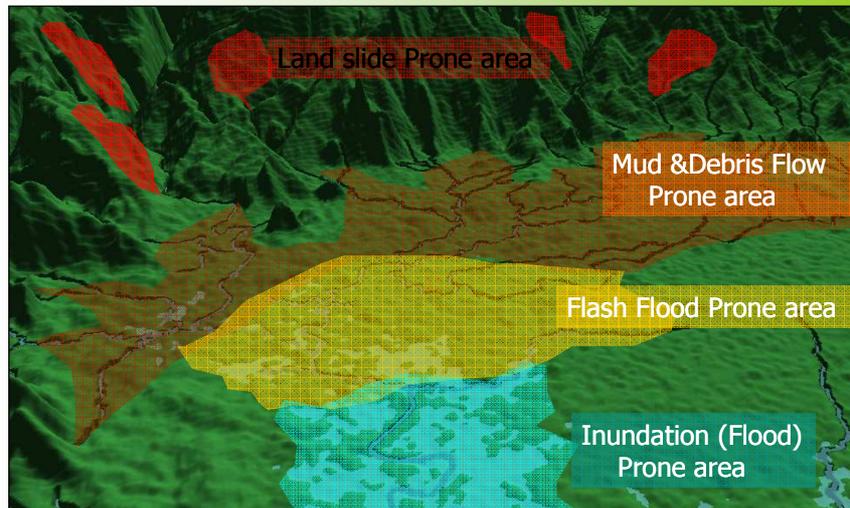
**Mud Debris flow (Flash flood)**

**GIS 1D-Hazard mapping**

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Chief of Safety Standard Sub-Bureau  
Disaster Prevention Measure Bureau  
Department of Disaster Prevention and Mitigation  
THAILAND



## Series of Hydrological Hazard Prone Area



## Flood and Mud & Debris flow Hazard Mapping

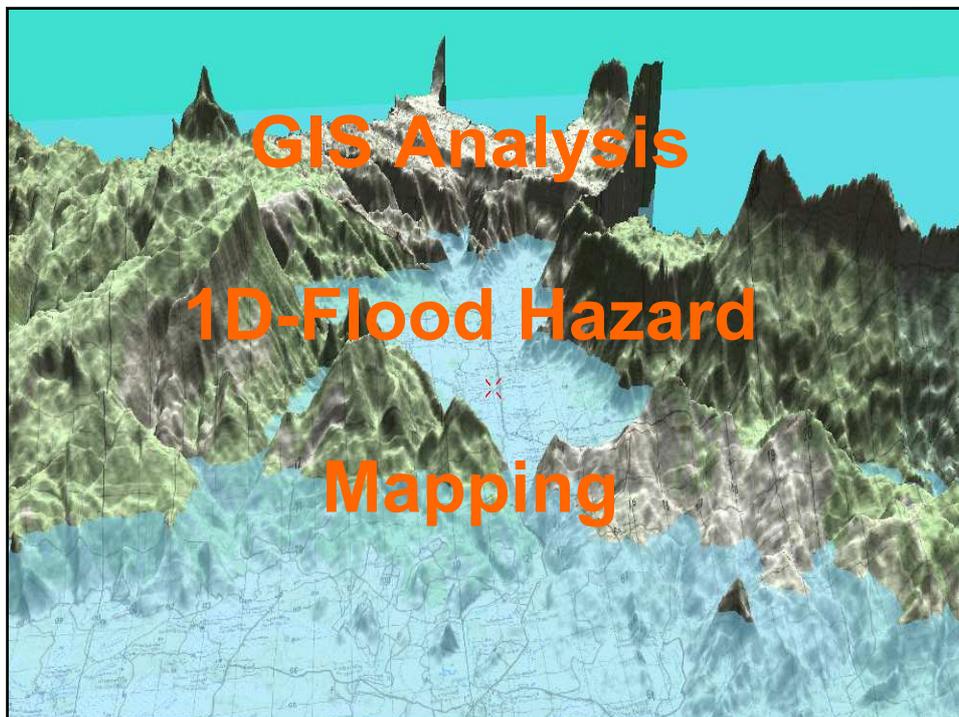
### ● Requested Output

- Because the Hazard Map should cover whole area of Thailand, it must be evenly prepared **regardless the available** data at each location
- The Hazard Map is not required the high accuracy but **necessary to be not far from the actual historical data**
- The Hazard Map should be **a base map for the Community Level Hazard Map**
- The Hazard Map should show **the risk area of residential area**

## Flood and Mud & Debris flow Hazard Mapping

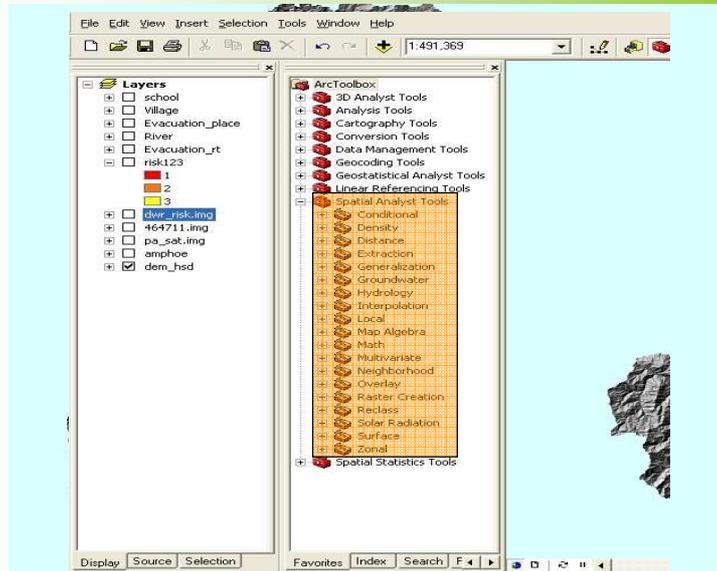
### ●Criterion of Methodology

- Mud & Debris flow must occur during flash flood event
- More Easier water flowing into the area, More potential risk of mud& debris flow.
- For economy and lacking data problem solution,
  - The less of data would be used in the model.
  - The model would be generalized, and not so high technology.
- The potential risk map would have enough scale for community levels.

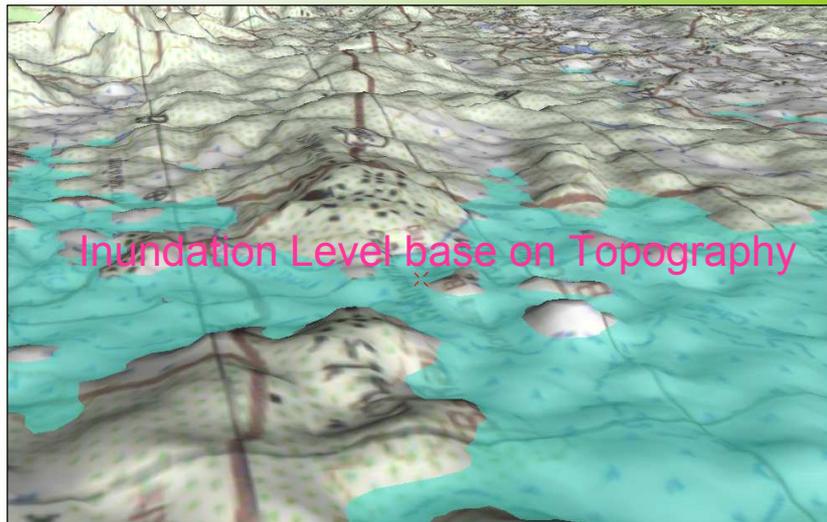


### GIS Analysis of FHM Flow Hazard mapping

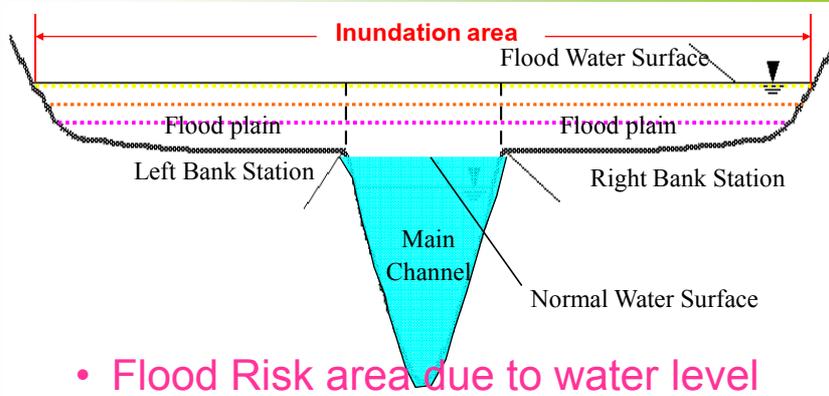
Software: ArcGIS9 with Spatial Analyst Tools



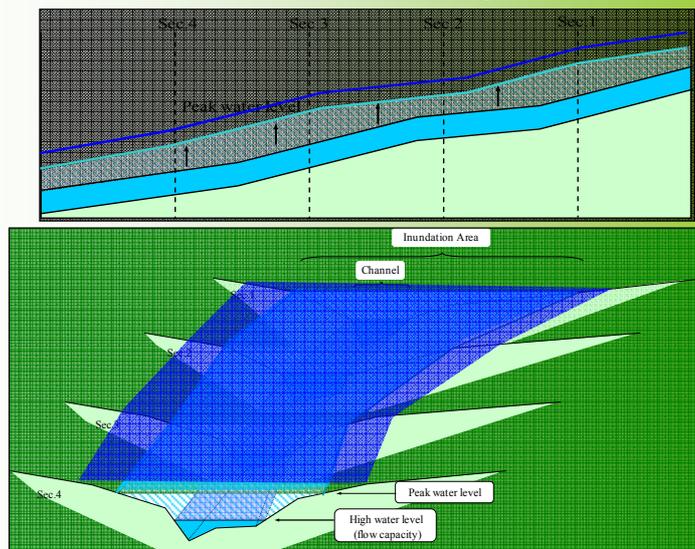
### Flood Potential Risk area Conceptual Idea



## Flood Potential Conceptual Idea

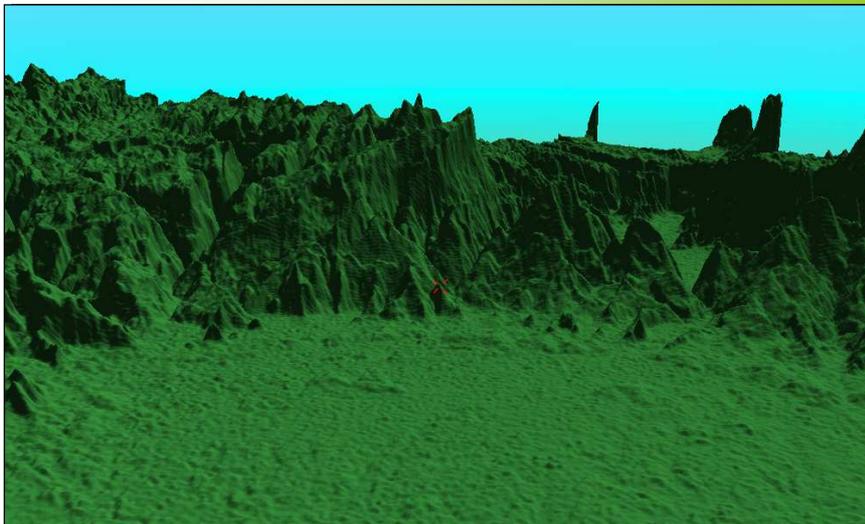


## Flood Potential Conceptual Idea



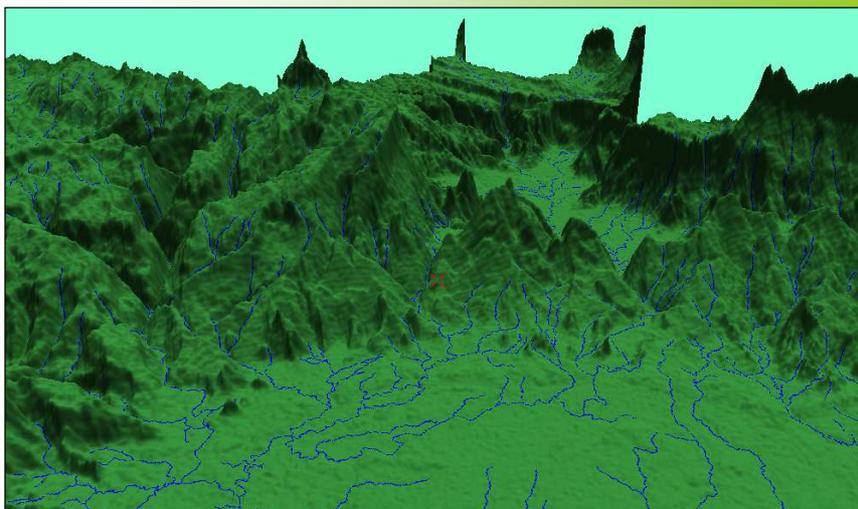
- Rise up water level on the surface and then capture the boundary of inundation

## Topography



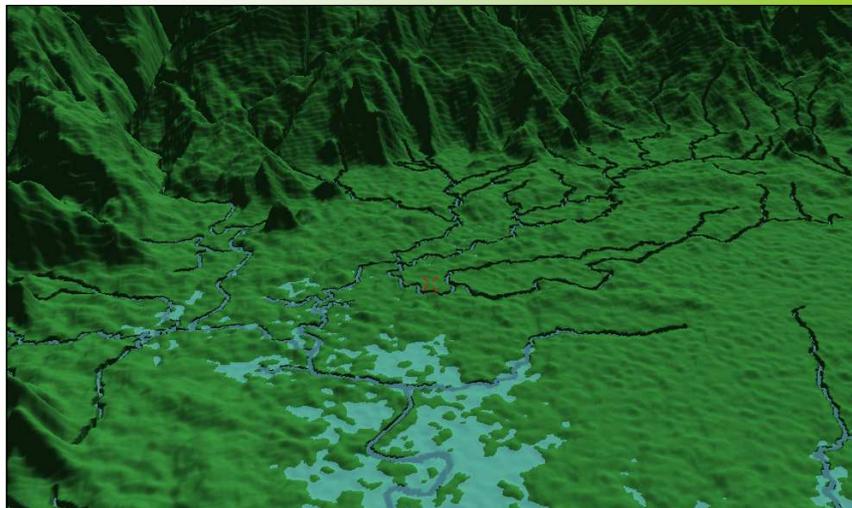
- **DATA:** Digital Elevation Model (DEM-3D view)

## FHM Procedure



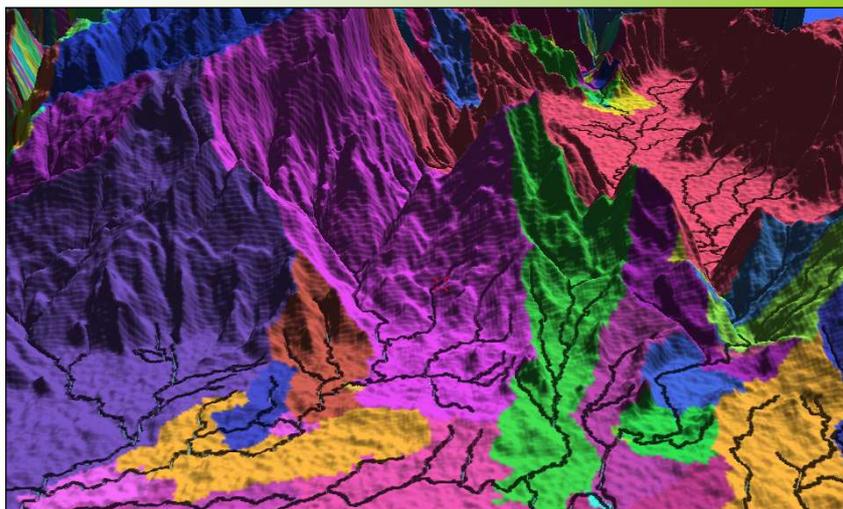
- **DATA:** Stream Line

## FHM Procedure



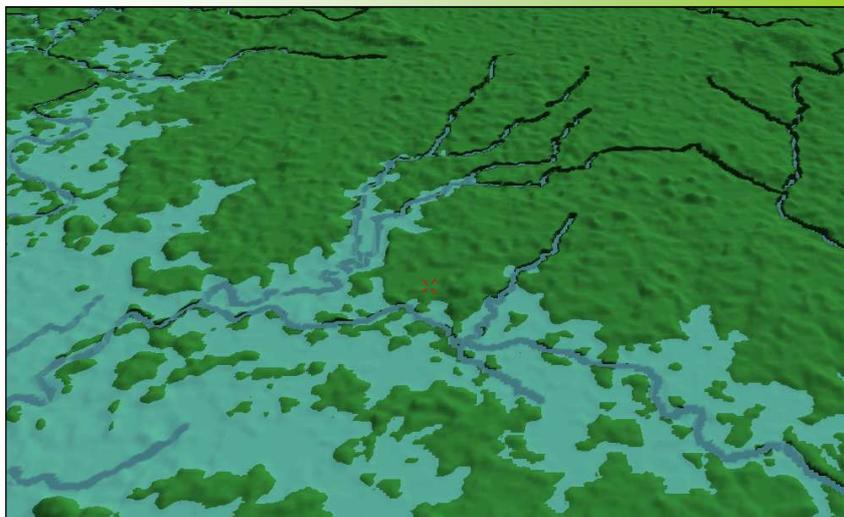
- Corrected Stream line on plain area of DEM

## FHM Procedure



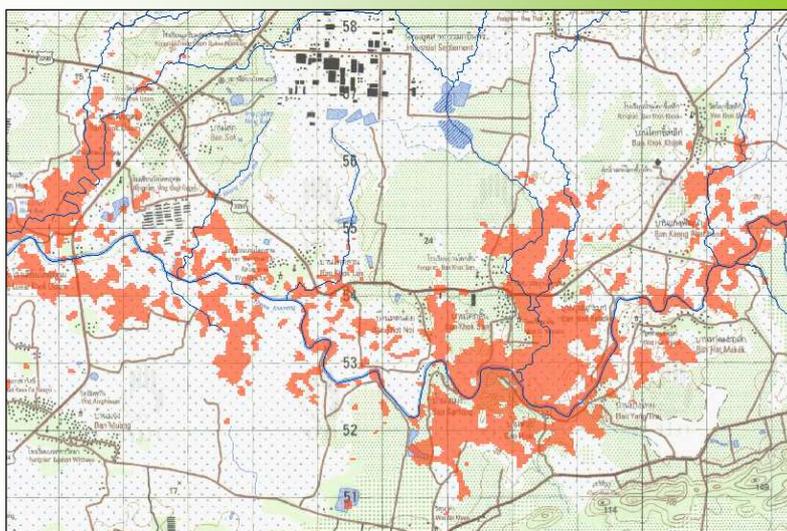
- **Hydrological analysis** :Lateral Watershed area analysis

## FHM Procedure



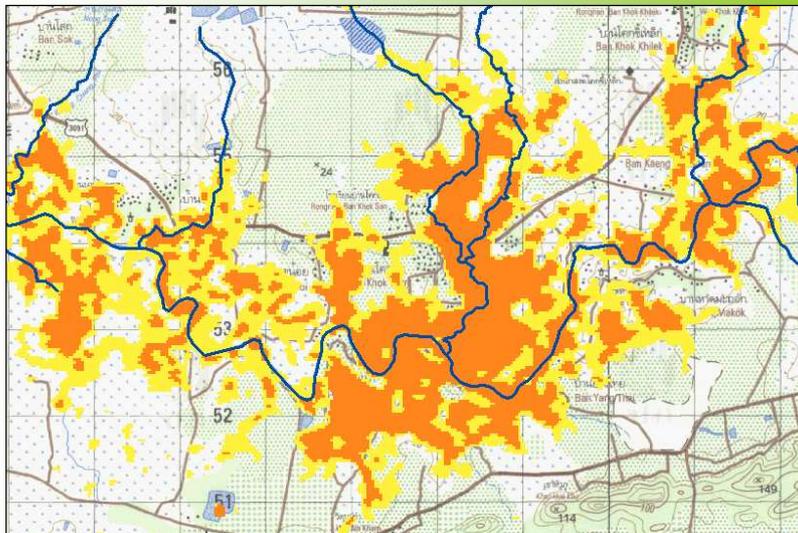
- Rise up Water level of each Lateral watershed

## FHM Procedure



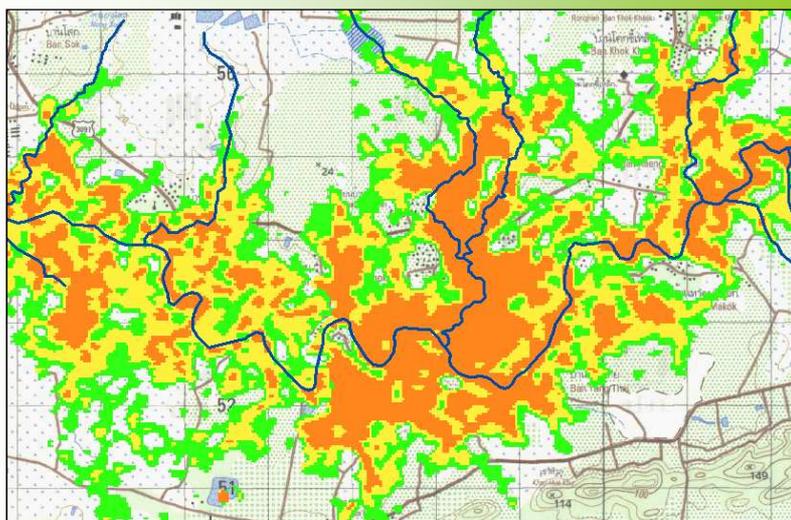
- 2D-Inundation area extraction of each water level

## FHM Procedure

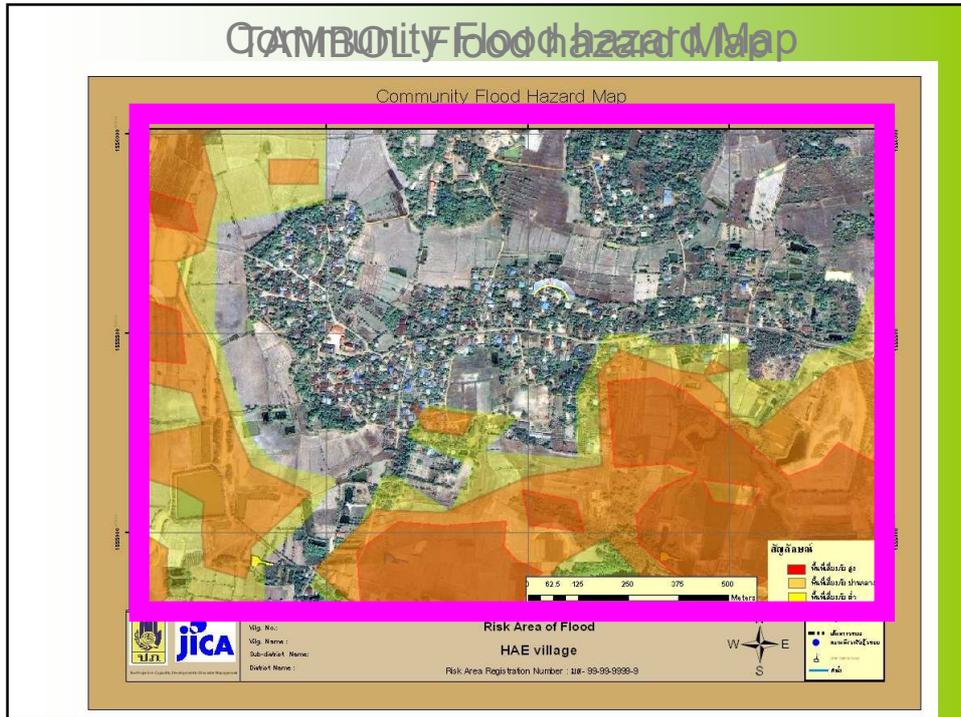


- 2D Inundation area extraction of each water level

## FHM Procedure

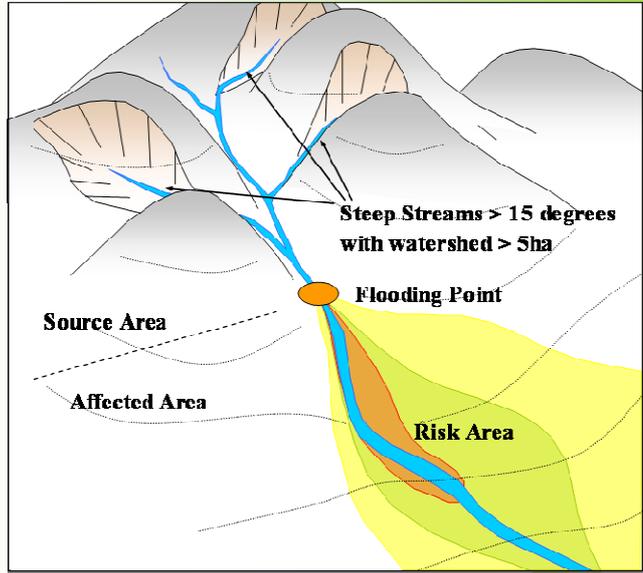


- Integrated Inundation area from each level to be Risk area

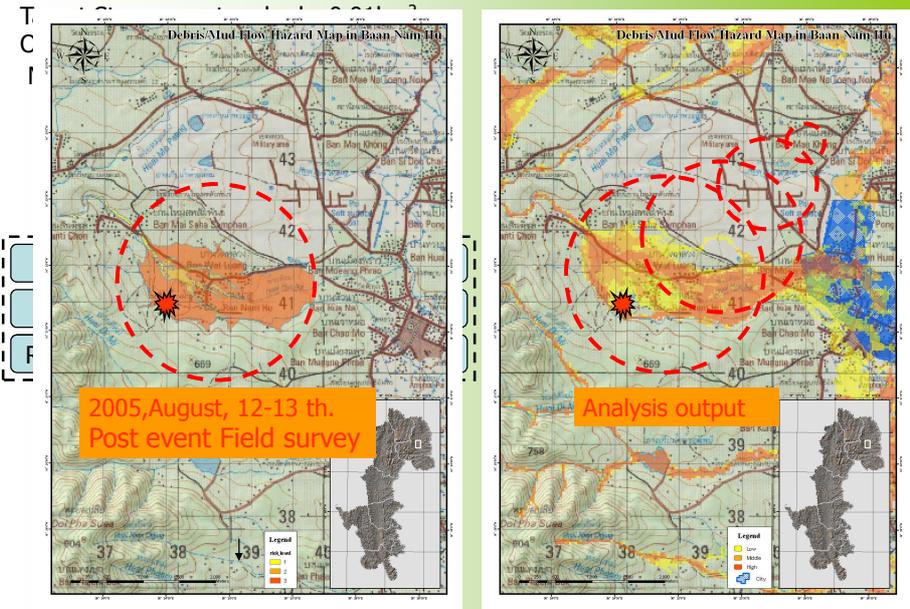


Mud & Debris flow  
&  
Flash flood  
1D-Hazard mapping

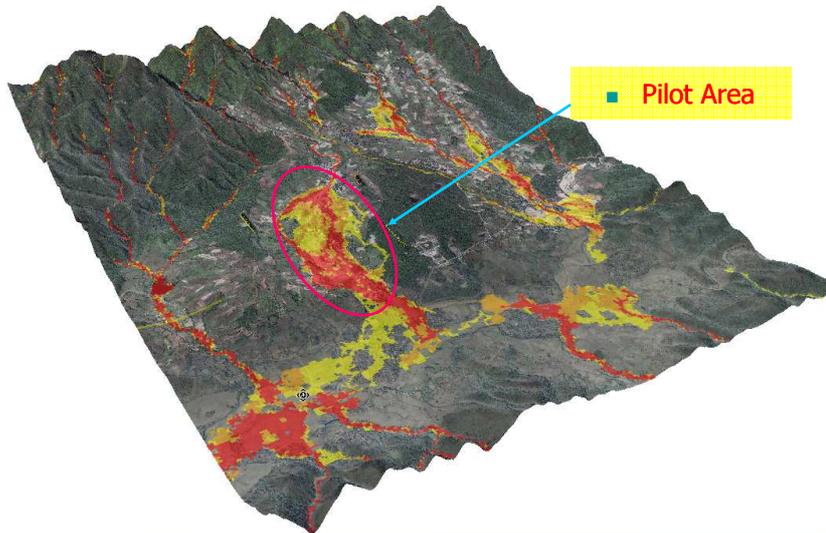
**Conceptual Idea of Mud & Debris Flow Analysis**



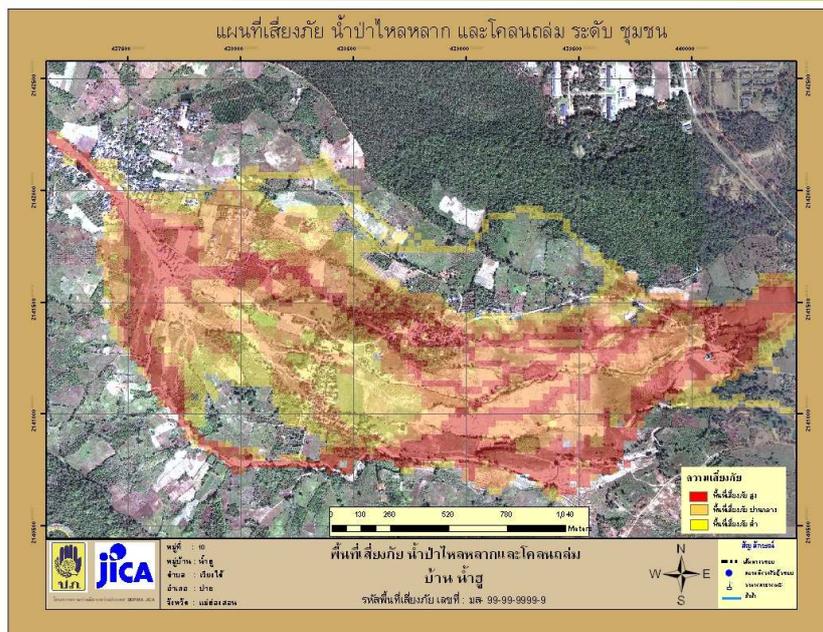
**GIS Analysis of Mud & Debris Flow Hazard mapping**

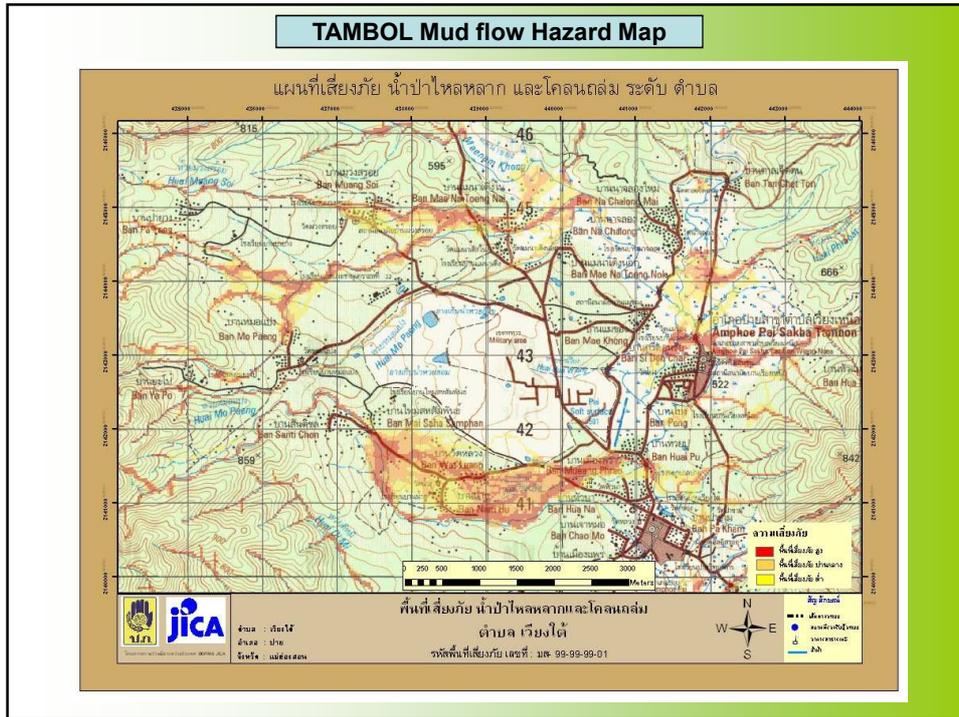


### GIS Analysis of Mud & Debris Flow Hazard mapping



### Community Mud flow Hazard Map

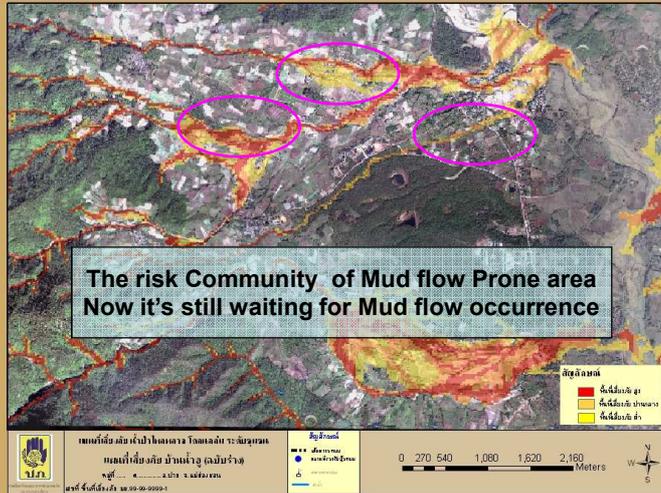




# The Utilization Idea of Hazard map

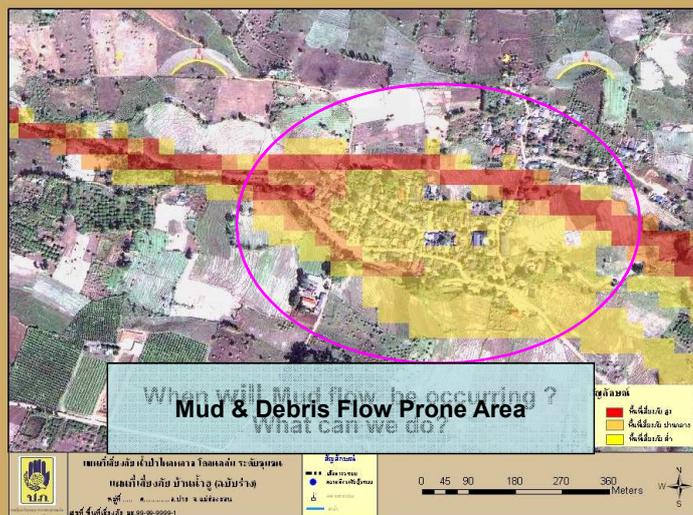
Many community waiting for Mud flow occurrence

Mud & Debris Flow Prone area



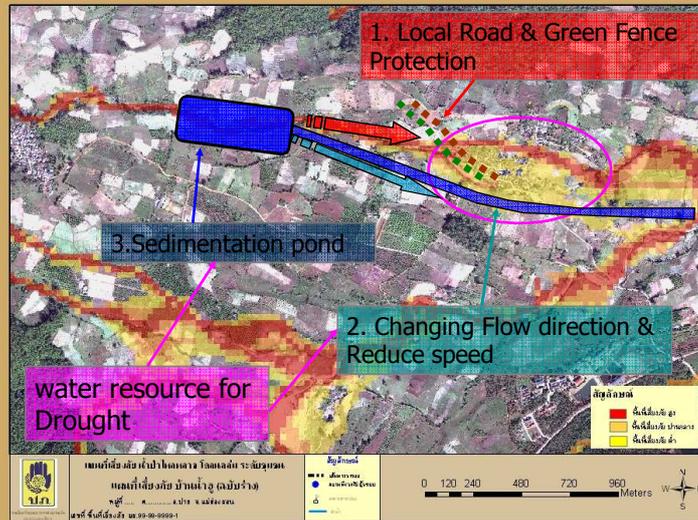
Many community waiting for Mud flow occurrence

Mud & Debris Flow Prone area



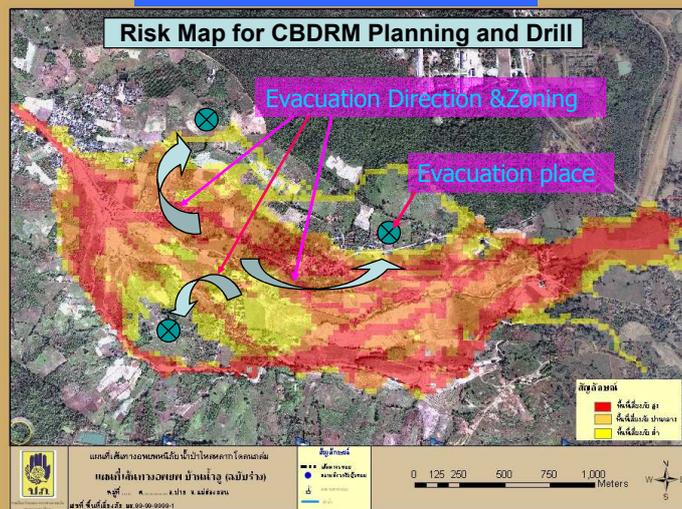
### Structural Measures Implemented

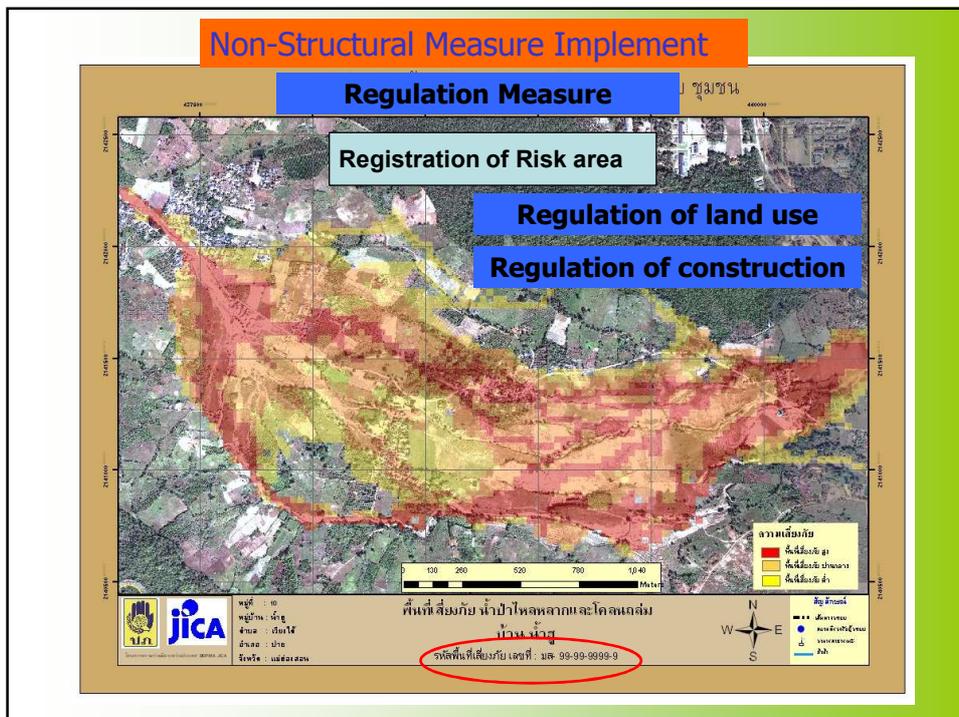
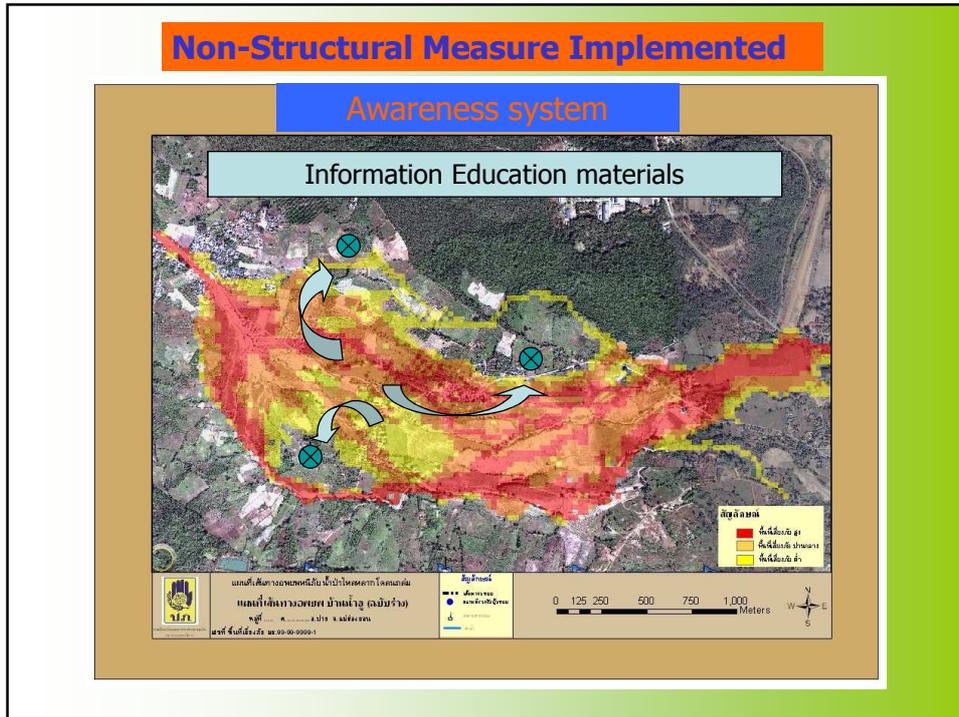
Mud & Debris Flow Prone area



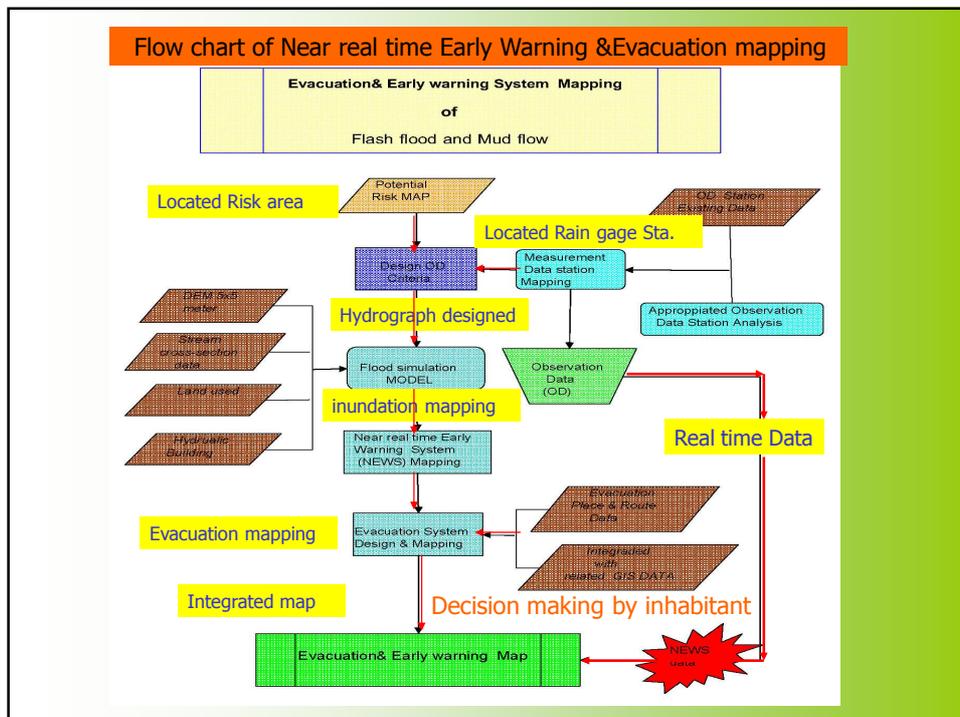
### Non-Structural Measure Implemented

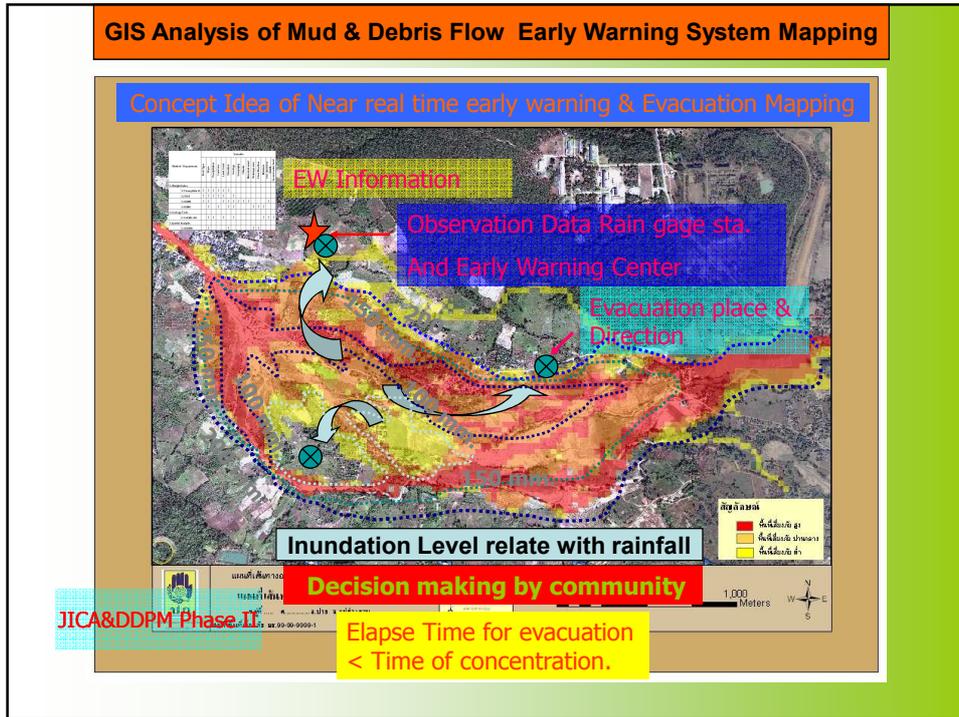
Preparedness system





# The implementation Idea of JICA&DDPM FHM 1D-Modeling For NEWS (Next step)



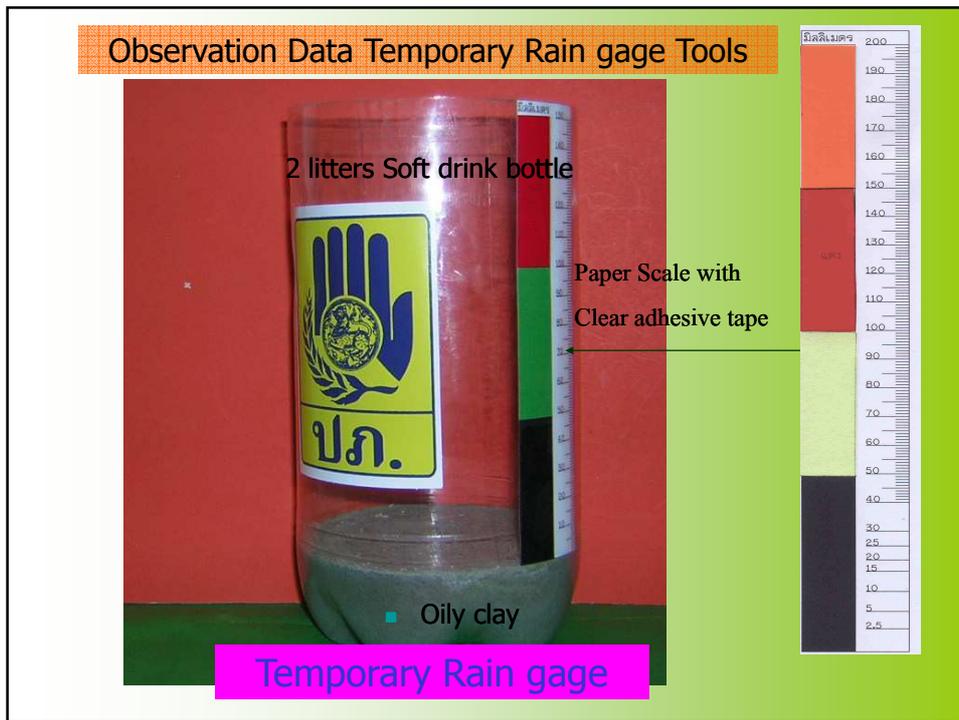


### Early Warning (EW) Information (Example)

Duration (hr.) \ Line No.	1	2	3	4	5
100	300	250	200	150	100
150	350	300	250	200	150
200	400	350	300	250	200
250	450	400	350	300	250

2 Hours of 300 mm. precipitation related with 150 inundation boundary line and the time that high peak of flood would be occurred in this area after rainstorm is equal to or less than the time of concentration.

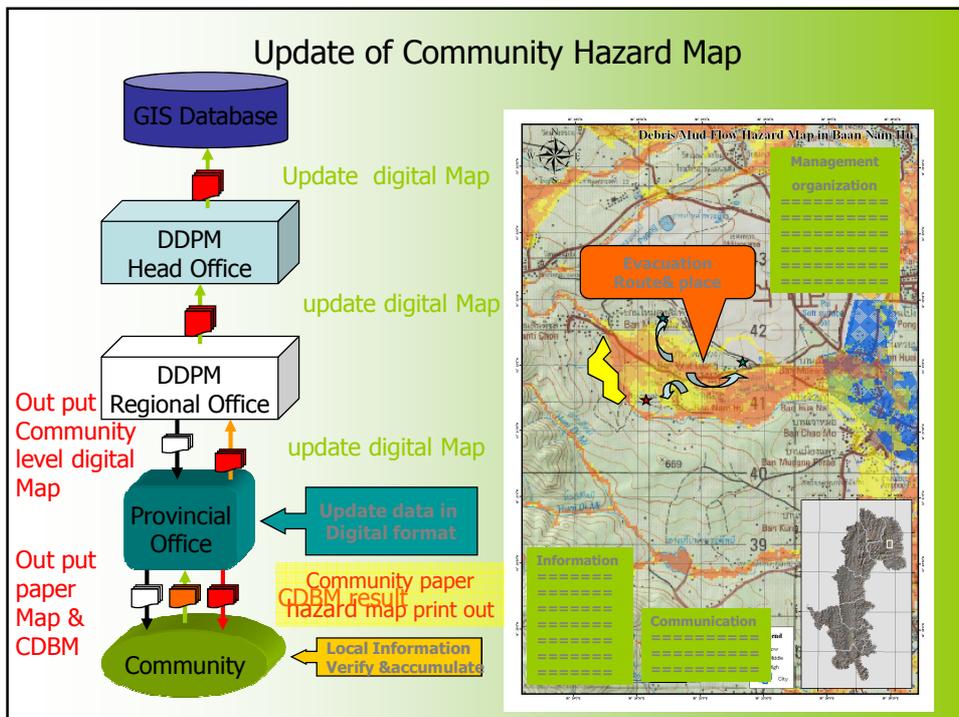
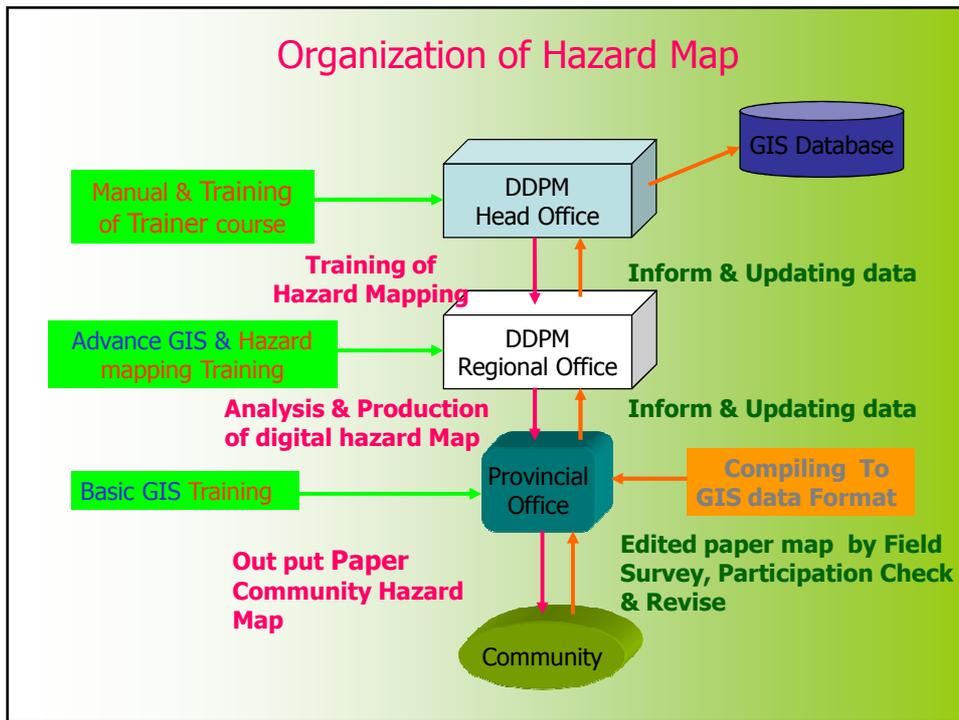
\*This is the time for evaluating the evacuation drill.

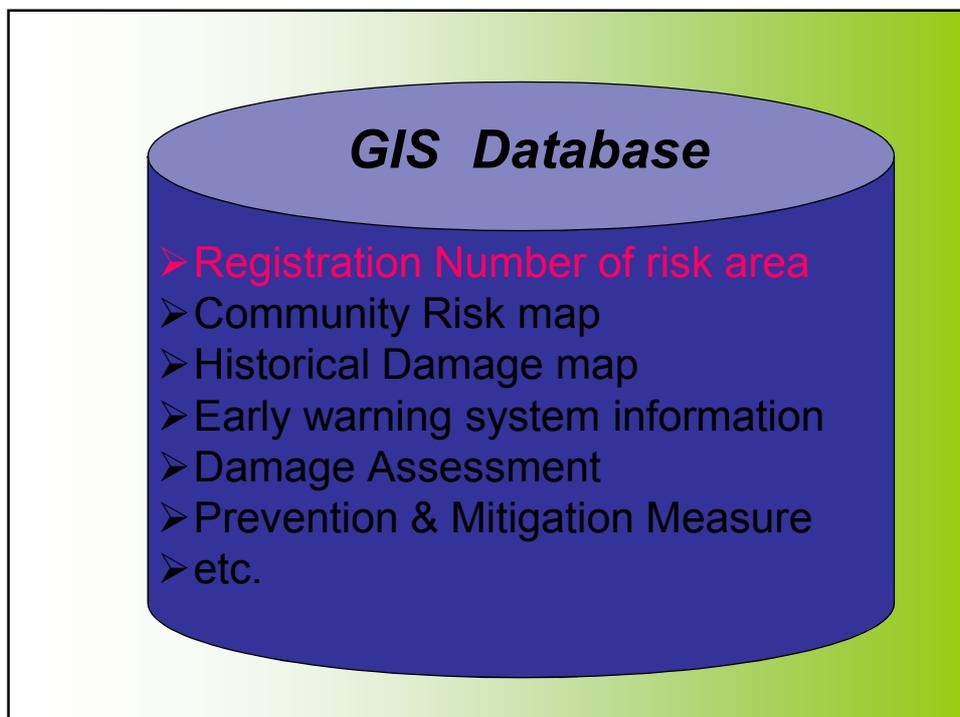
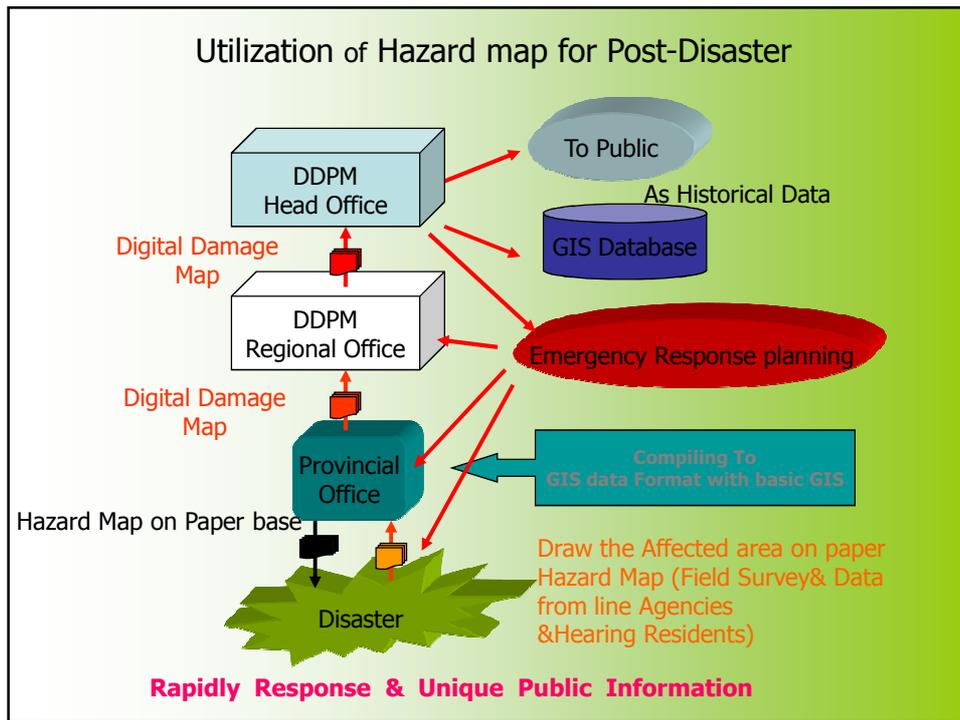


## Require Tools and technology

- Soft ware for easier design a lot of Hydrograph (IFAS)
- Soft ware for Flood simulation(HECRAS,etc.)

Capacity Building of DDPM  
on Disaster management  
with Hazard Map  
(on going step)





# The implementation of JICA&DDPM FHM Modeling 2009-10 DDPM&MRC Project on Land use Management Program

## 2008 Mea Khong River Flood in Thailand

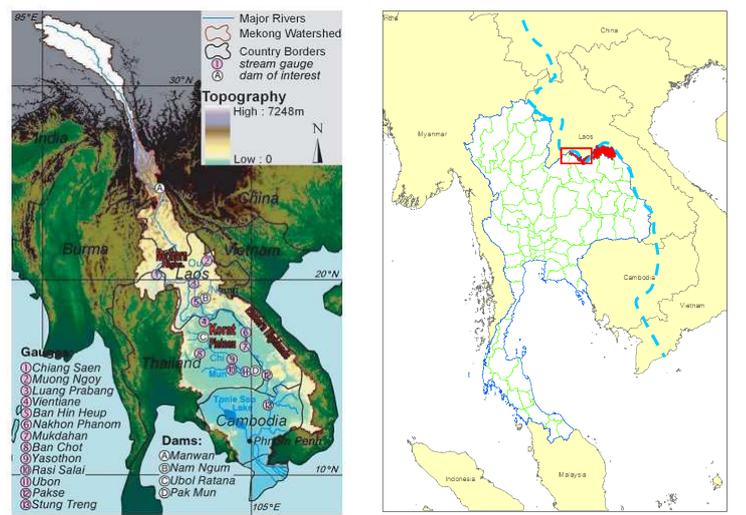
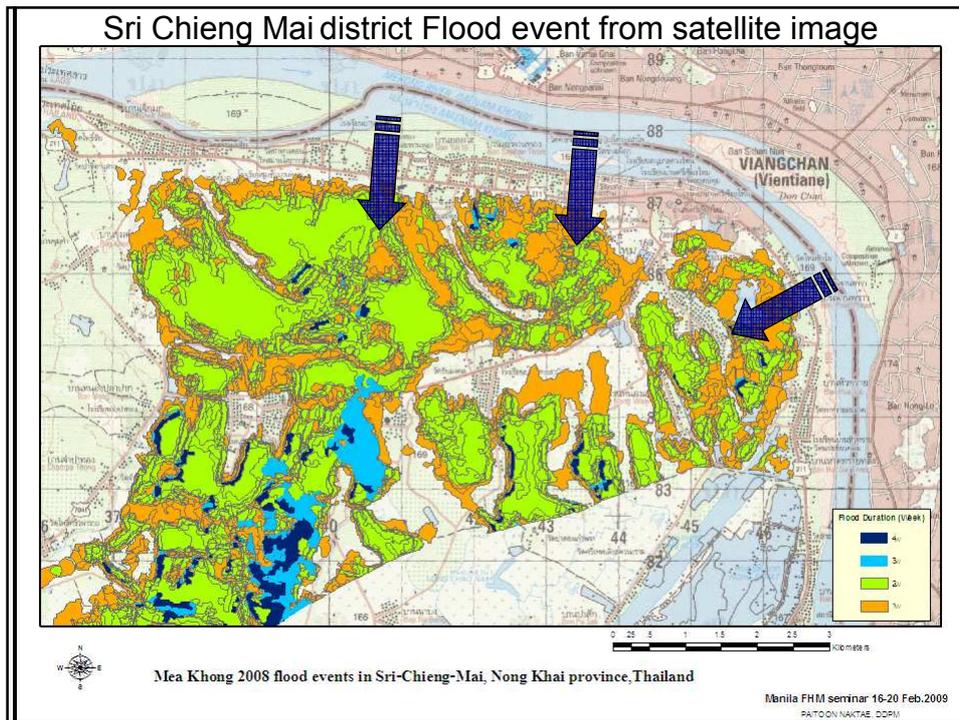


Figure 1. The Mekong river basin topography, major streams, location of stream gauges, and location of dams operating in the simulation period (1979-2000)

2008 Mea Khong Flood in Sri Chiang Mai District, Nong Khai Province



Over Levee flow on 14-16 Sep.08



Over Levee flow on 14-16 Sep.08



## Erosion down stream



## Damage from Erosion



## Damage from Erosion



FHM on Sri Chiang Mai district is on going for construction

