

Coastal hazard and risk assessment

Jothiganesh Shanmugasundaram (Jothi)
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Image: Ravana - a character in an famous Indian epic Ramayana.

Snow on forest



Capacity to clean or ride



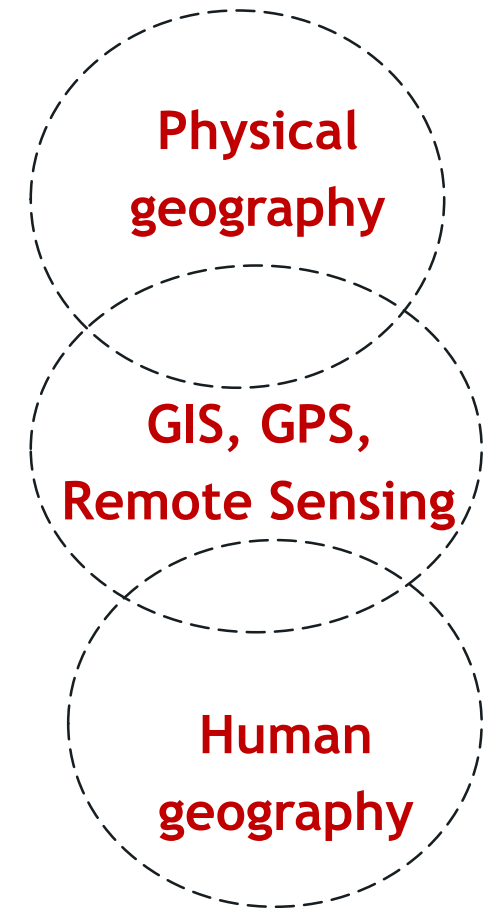
Snow on roads



$$\text{Risk} = \frac{\text{Hazard} \times \text{Vulnerability}}{\text{Capacity}}$$

Geographers role in the risk assessment..

- 1) Knowledge about physical geography
- 2) Inputs for **hazard (coastal inundation)** modeling (Bathymetry and digital elevation model for the shore)
- 3) Hazard maps - Visualizing the coastal inundation
- 4) **Exposure** data (**roads, houses**) generation - digitize data from satellite image
- 5) Field validation of the digitized data layers
- 6) Field interviews - vulnerability assessment
- 7) Generating risk map, evacuation map



1. Knowledge of physical geography

- ▶ Slope of the sea shore
- ▶ Elevation of the shore line
- ▶ Vegetation in the areas
- ▶ Hurricane season (climate) for storm surge hazards
- ▶ Subduction zones for tsunami related hazards



Image: Coastal area of Dili, East Timor

2. Digital elevation model generation

High resolution DEM
generation for inundation
modeling using high
accuracy RTK GPS
equipment's



Image: DEM generation using RTK GPS in Thailand

3. Hazard map - visualizing coastal Inundation

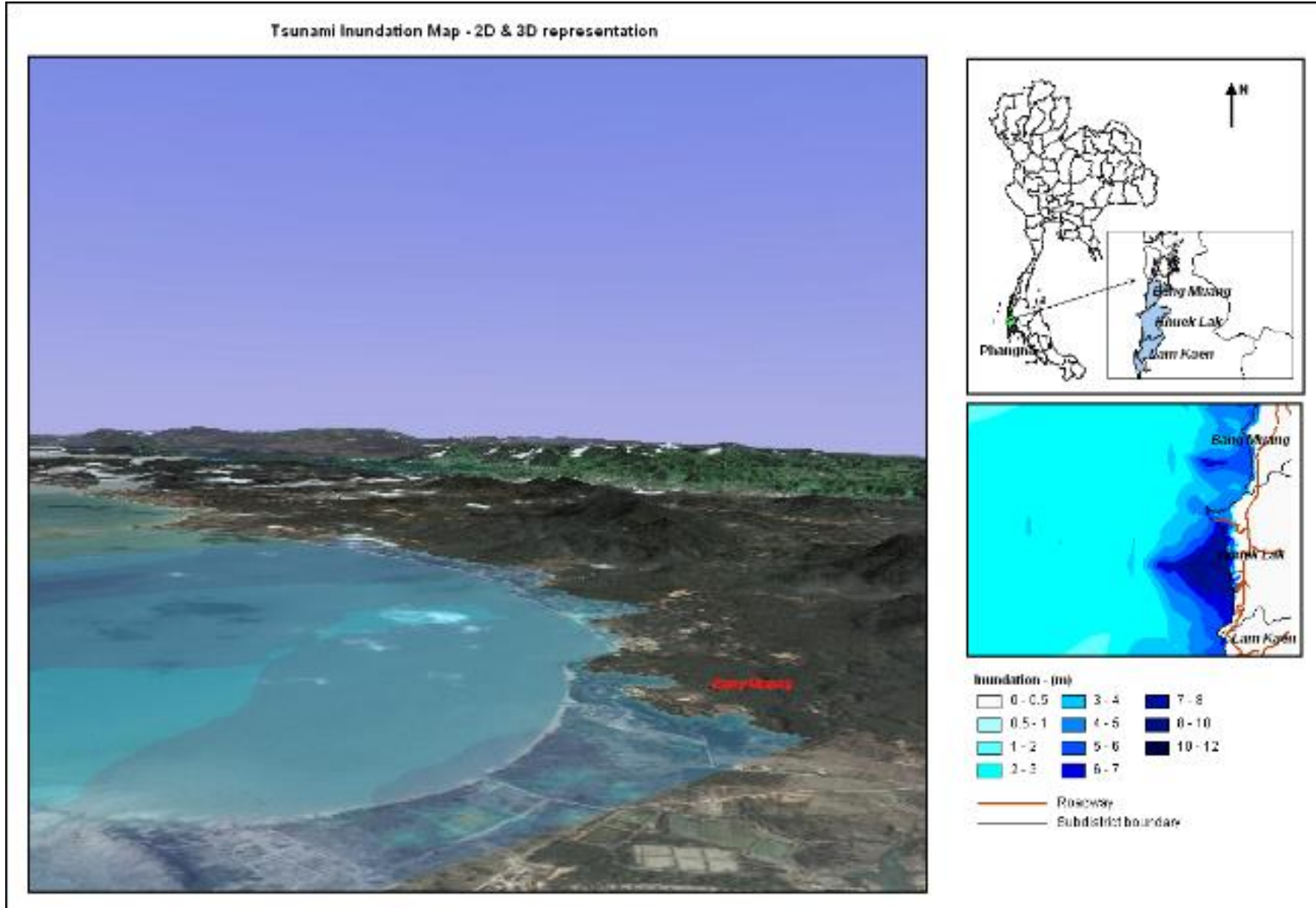
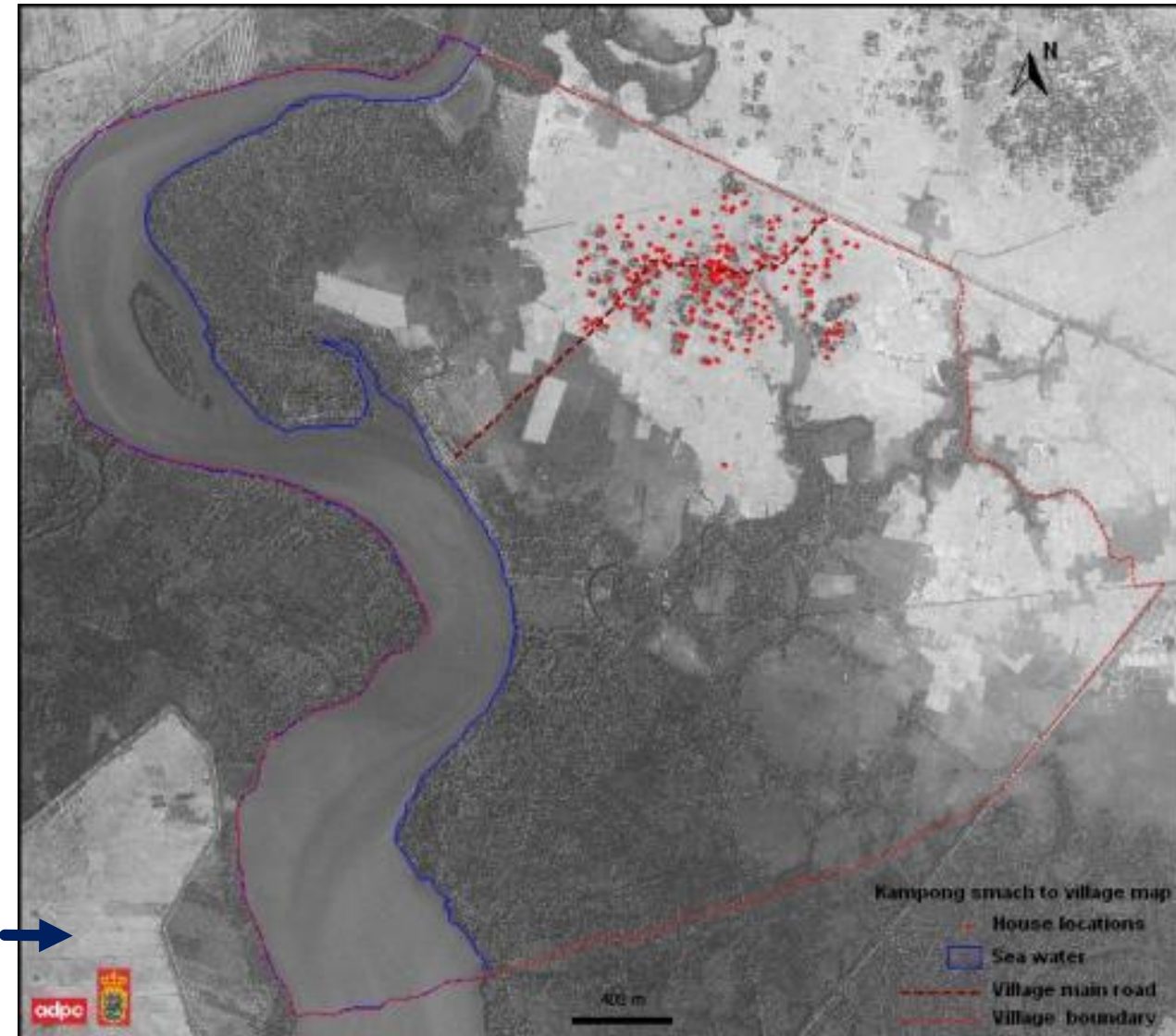


Image: Map showing coastal inundation over a beach in Phuket, Thailand

4. Exposure data digitization

- ▶ Aerial photographs (geo-referencing and mosaicking)
- ▶ Digitizing data layers such as roads, house location, water bodies etc.,



5. Field validation

Validate the digitized data in the field with the help of GPS



Image: Data validation in Teuk Lak village, Cambodia

6. Field interviews

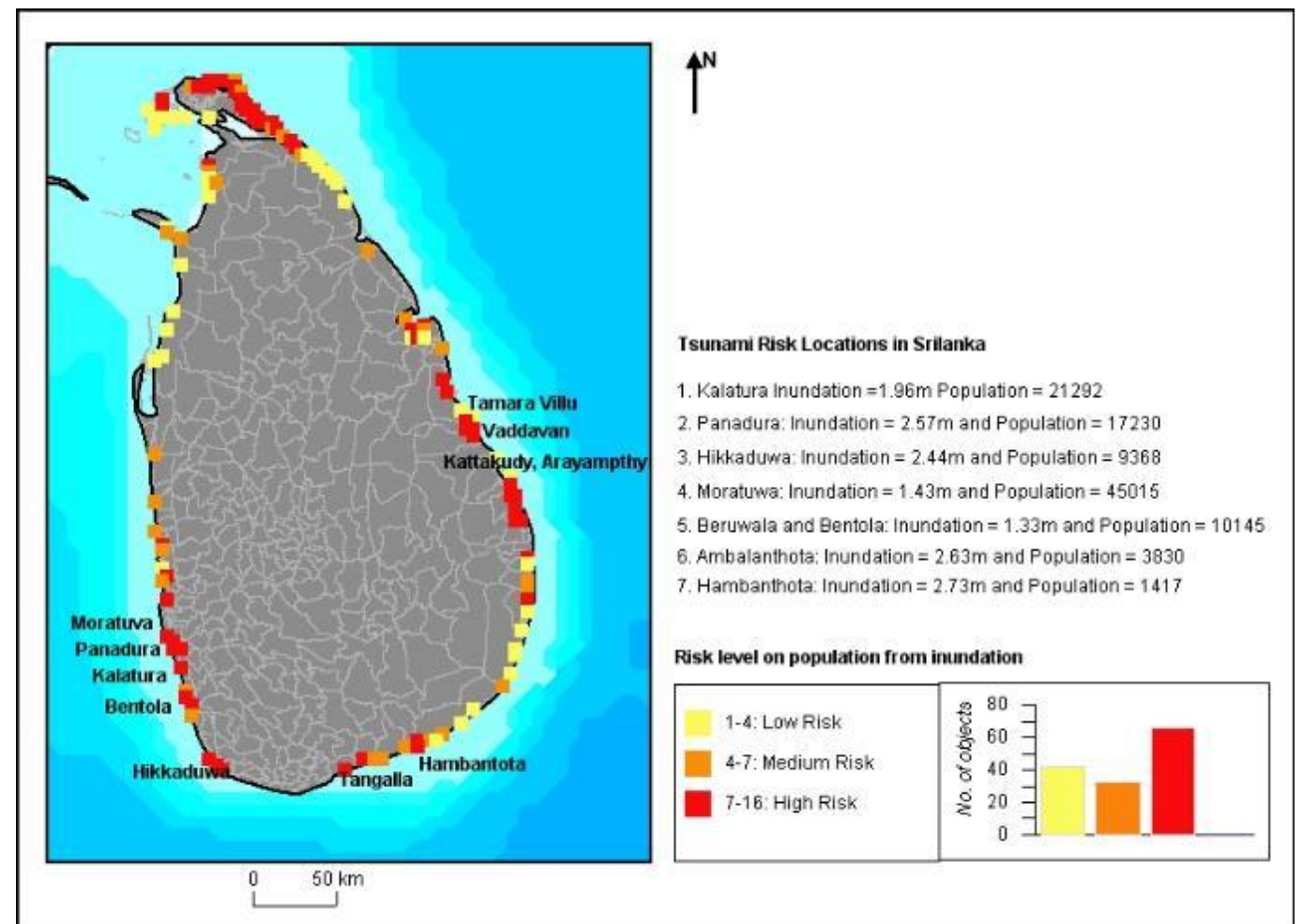
Field Interviews

(Participatory Research Approach) to discuss with local community to understand the past impact of a hazard (Vulnerability assessment)



Image: Participatory risk assessment in a pilot village of Vietnam

7. Risk Map

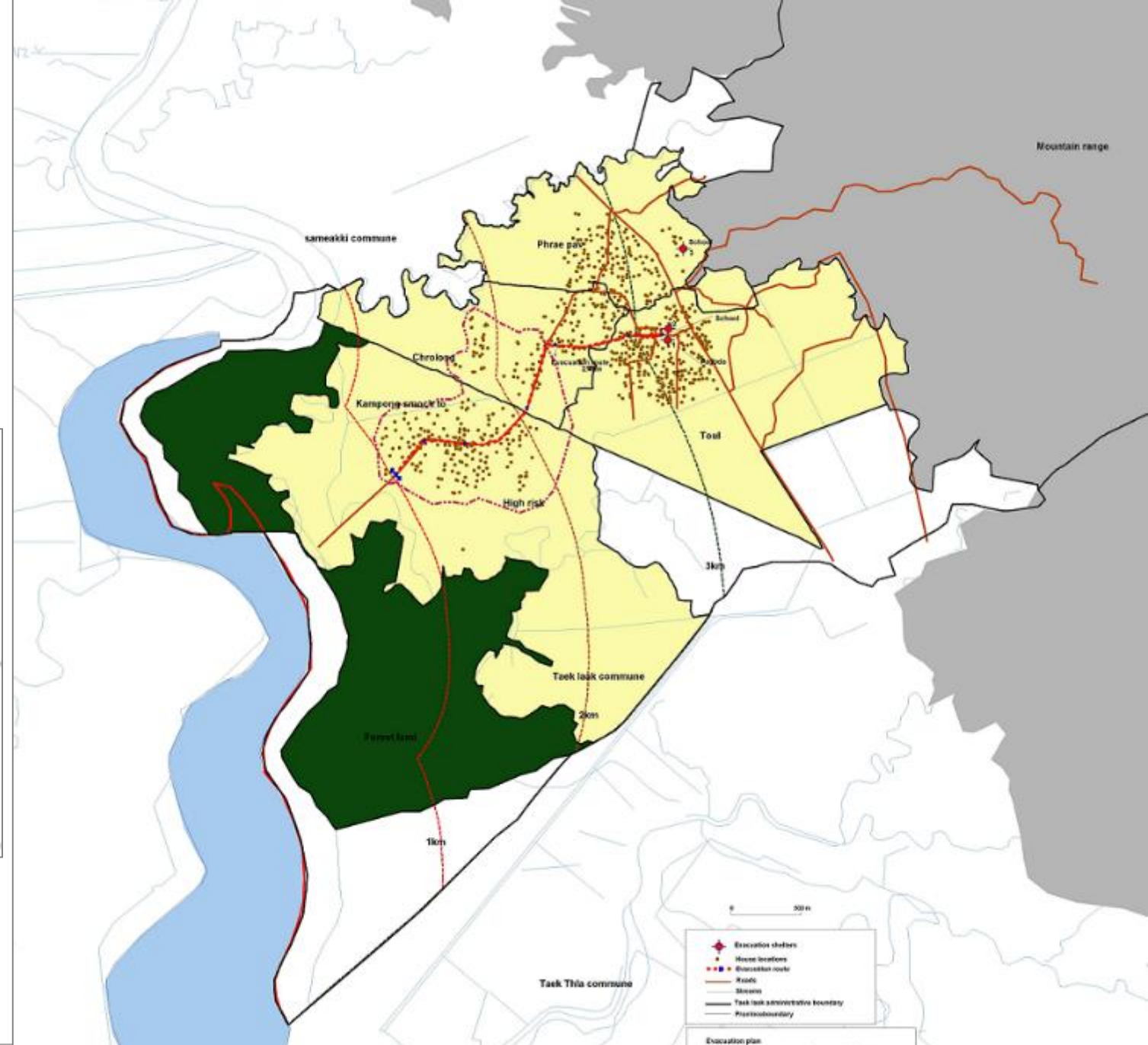


Hazard - Inundation (m)	Exposure Population in 5 Sq.km	Risk
0.5 to 1.0	1 - 500	Low
1.0 to 1.5	500 - 1000	Medium
>1.5m	>1000	High

8. Evacuation Map



Image: Evacuation map of Teuk Lak village, Cambodia



Web based tools on coastal hazard and risk assessment

<https://www.csc.noaa.gov/digitalcoast/tools/list>

> 20 tools available



Sea Level Rise and Coastal Flooding Impacts Viewer



Historical Hurricane Tracks