



# **A Web Map for Emergency Information System: an Interface for Community –based Emergency and Recovery Response in Merapi Volcanic Eruption**

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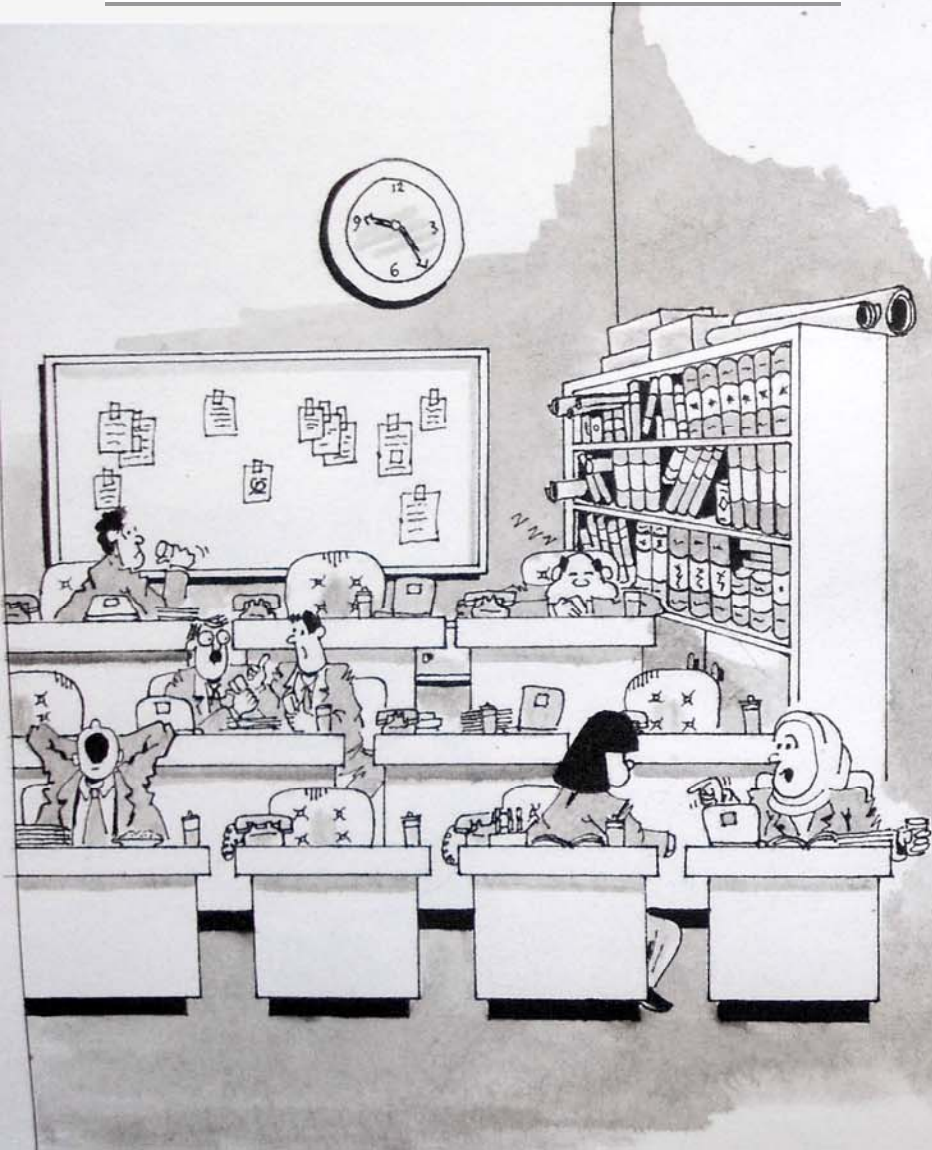
**Center for Spatial Data Infrastructure Development ,Faculty of Engineering, UGM**

**AGUNG SUBROTO**

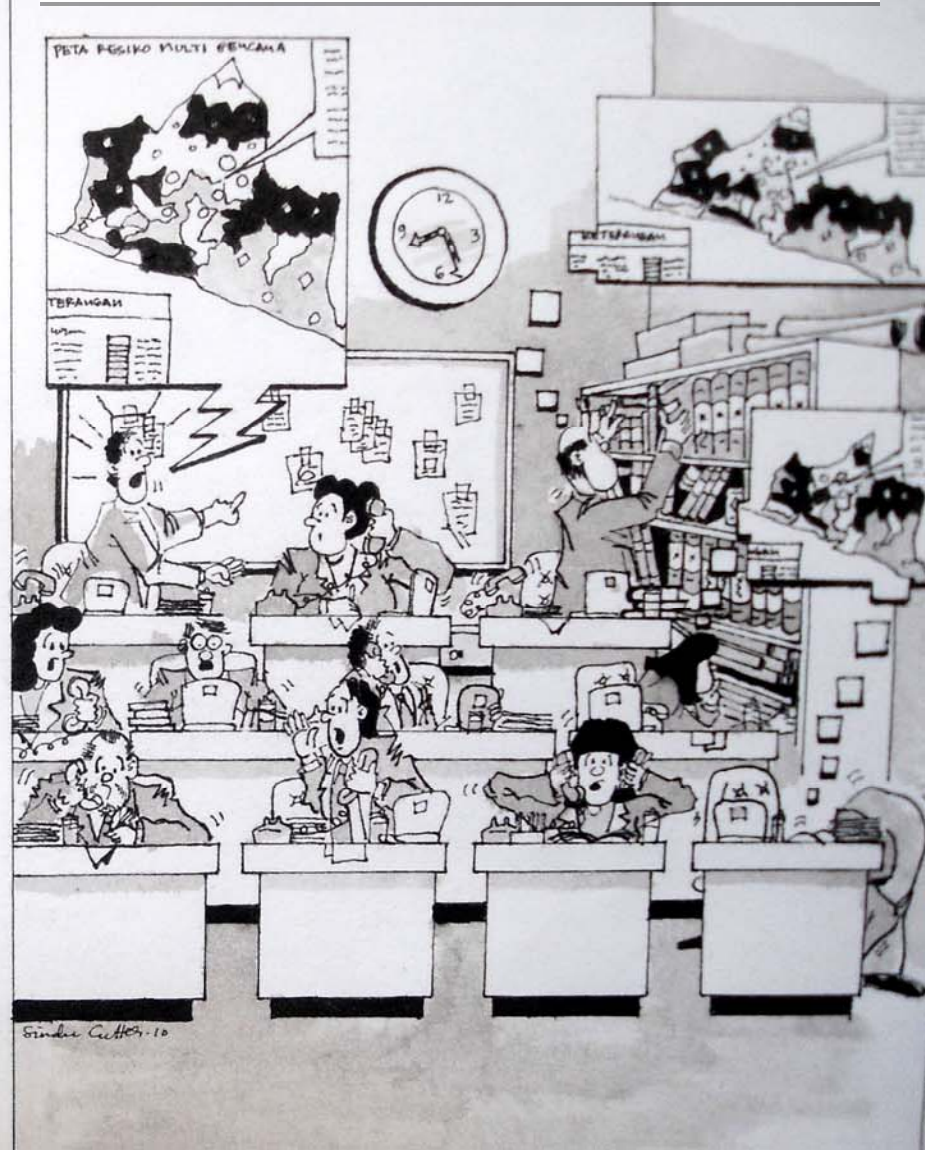
**ECC, Faculty of Engineering, UGM**



# BEFORE A DISASTER EVENT



# ..JUST AFTER A DISASTER EVENT



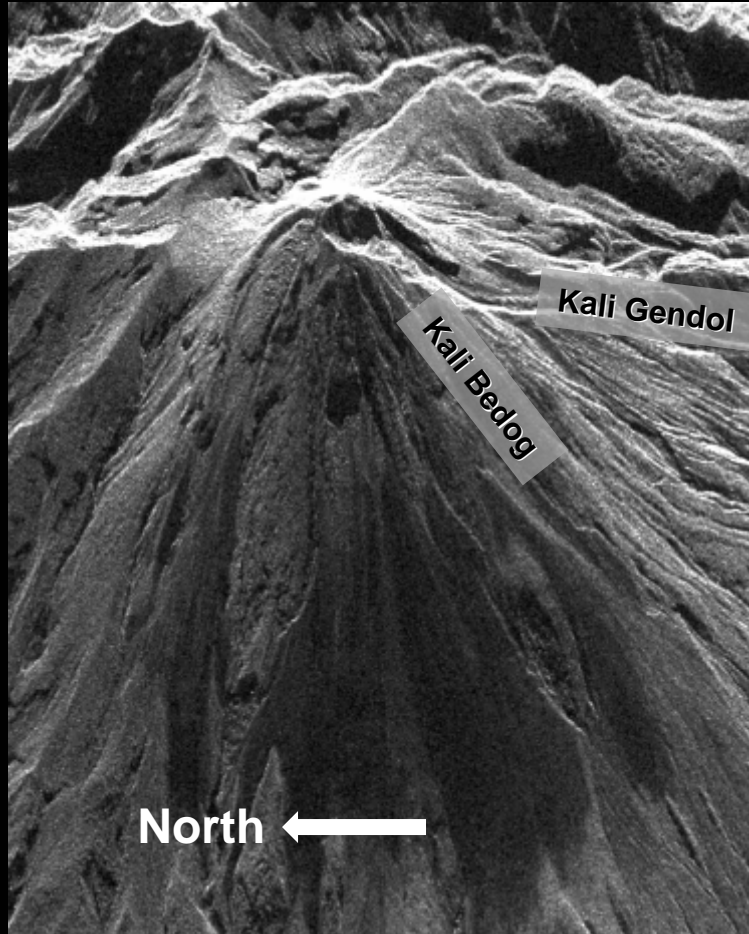
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- Introduction: Disaster & Crisis
- Motivation: Location & Participation
- Implementation: Mapping Camps & Damages
- Lessons-Learned: Why Maps Matter
- Further Developments: Mobile Use Scenario
- Conclusions

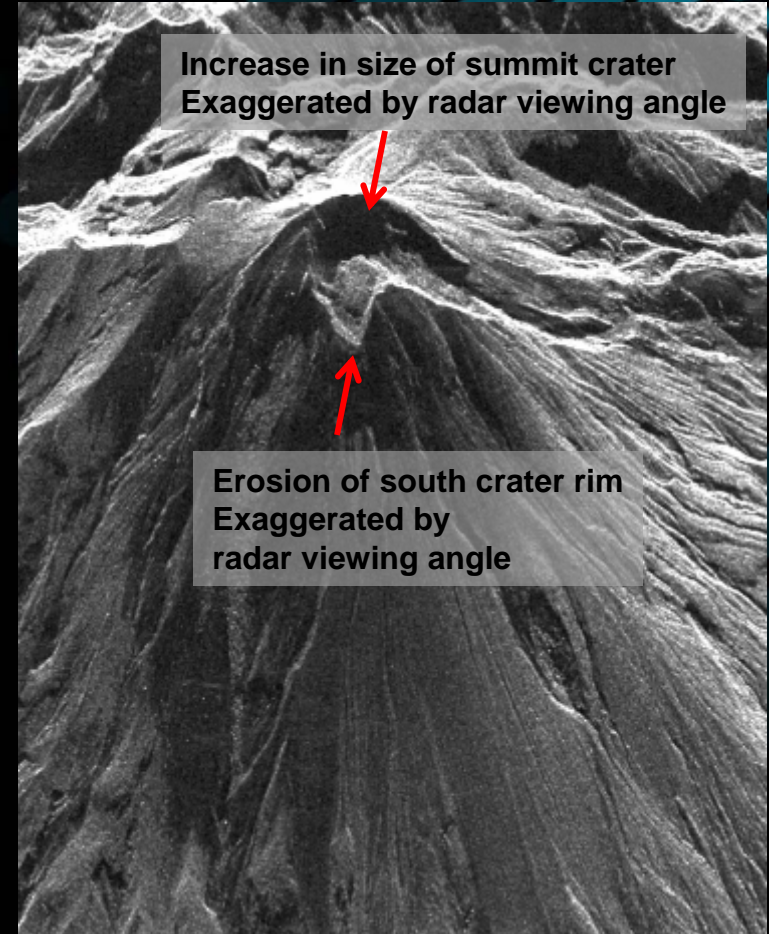


# TerraSAR-X: Merapi Comparison

26 October 2010



6 November 2010



Data Copyright 2010  
German Remote Sensing Data Center (DFD)  
German Aerospace Center (DLR)



# Rural Hazard: Debris Flood Disaster





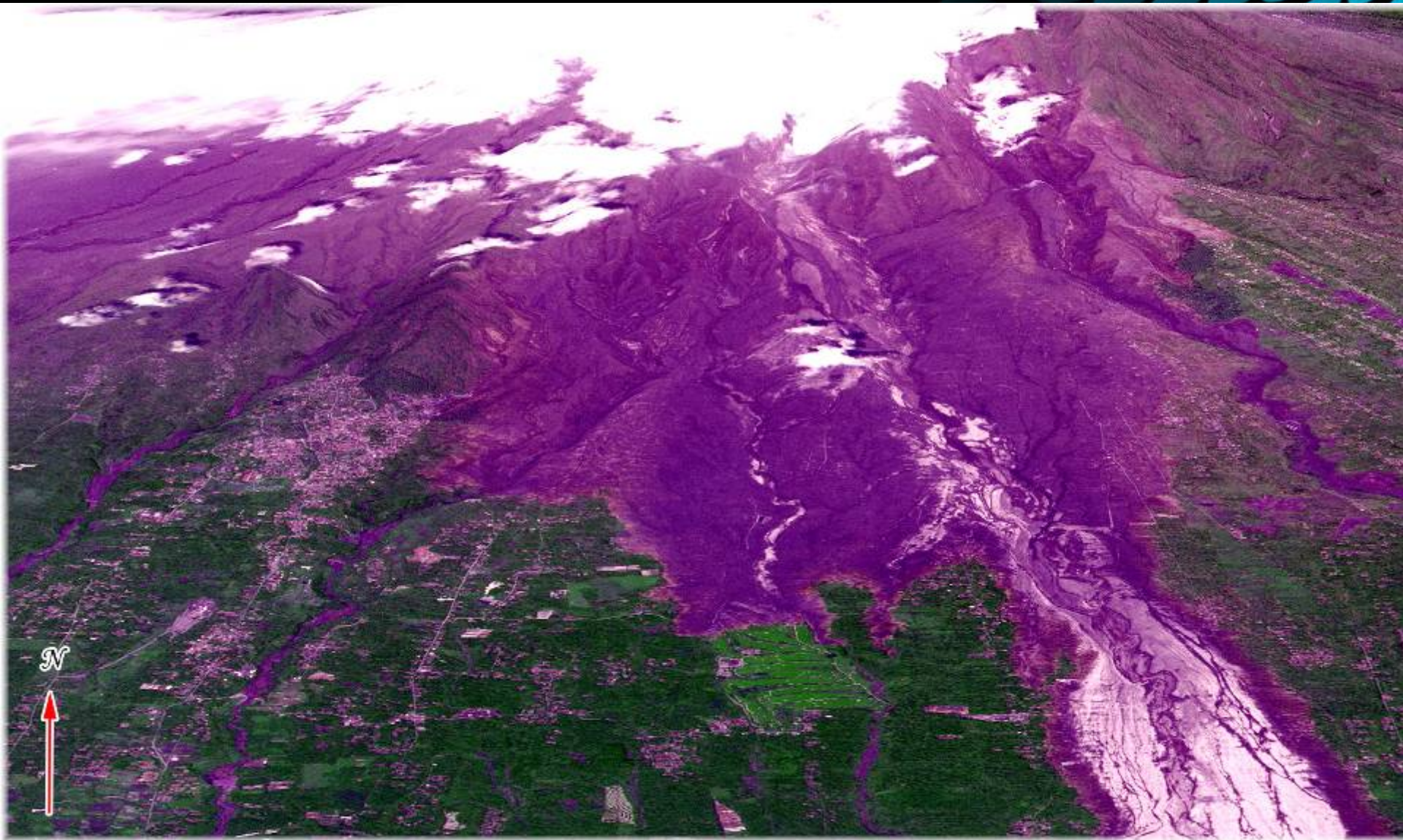




# Urban Hazard: Debris Flood Disaster







Source: [www.crisp.nus.edu.sg](http://www.crisp.nus.edu.sg)

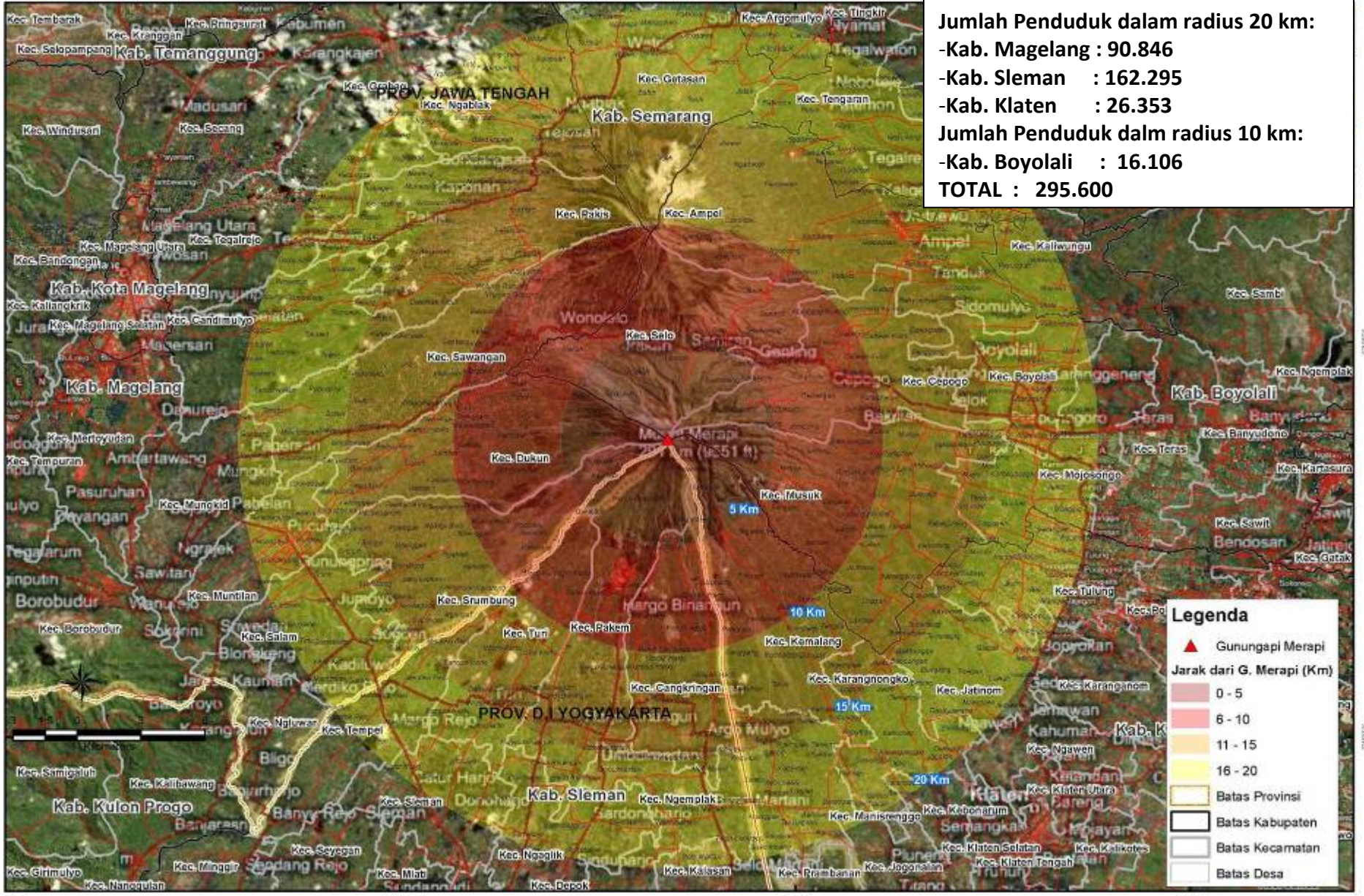




# PETA WILAYAH DESA DALAM ZONA ANCAMAN MERAPI (JARAK RADIUS 20 KM) DARI PUNCAK GUNUNGAPI MERAPI

Update Kondisi Ancaman Merapi Per Tanggal 4 November 2010

**Jumlah Penduduk dalam radius 20 km:**  
 -Kab. Magelang : 90.846  
 -Kab. Sleman : 162.295  
 -Kab. Klaten : 26.353  
**Jumlah Penduduk dalam radius 10 km:**  
 -Kab. Boyolali : 16.106  
**TOTAL : 295.600**



**Legenda**

- Gunungapi Merapi
- Jarak dari G. Merapi (Km)**
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- Batas Provinsi
- Batas Kabupaten
- Batas Kecamatan
- Batas Desa







# MAIN CAMP: LOCAL STADION

Number of IDPs registered in 1st week : 9.492 LIVES

Managed by) : Local Disaster Agency



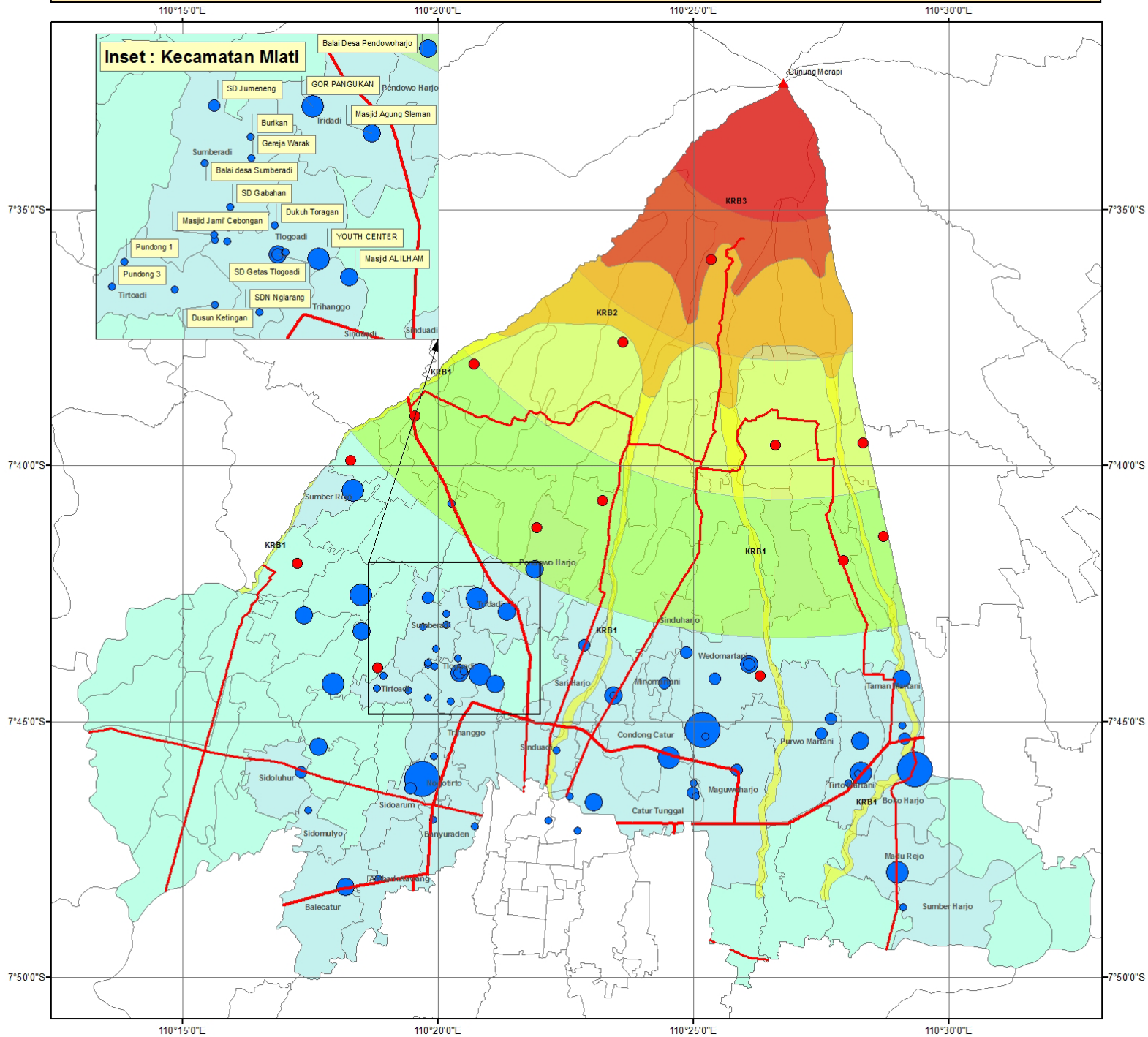
Courtesy : BNPB



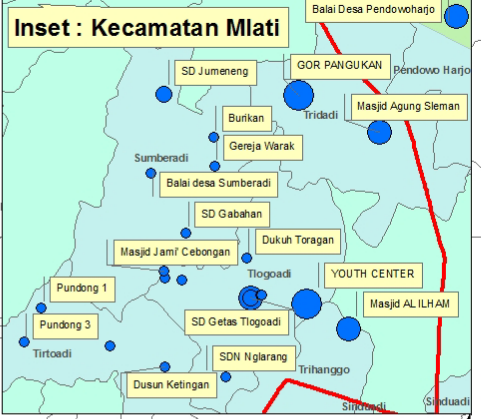
More other camps.....







**Inset : Kecamatan Mlati**



7°35'0"S

7°35'0"S

7°40'0"S

7°40'0"S

7°45'0"S

7°45'0"S

7°50'0"S

7°50'0"S

110°15'0"E

110°20'0"E

110°25'0"E

110°30'0"E

# Disaster & Crisis After 5/11/2011

Humanitarian Crisis due to Disaster Events include:

- Displaced People, Emergency Aids
- Damaged Properties, Threaten Livelihood ,

Humanitarian Post Disaster Responses cover:

- Basic needs (water, shelter, infrastructure, health)
- Special needs (Pregnant woman, children, IDP with disability)
- Long term rehabilitation and reconstruction

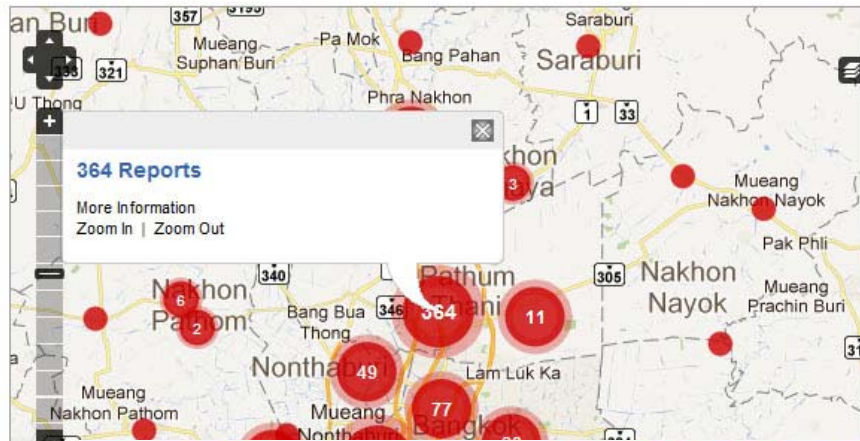


## Participation & Location

- **Disaster Risk Reduction Forum** of Yogyakarta Special Region) needs to organize its members' humanitarian responses into thematic clusters:
  - Shelter cluster
  - Water and Sanitation cluster
  - Logistics cluster
  - Education cluster
  - Child and Vulnerable groups' clusters
  - etc
- All members in the forum need common information on:
  - How much camps and needs
  - Where to put assistances and aids

# Crowd Sourcing: Web 2.0 for Disaster Responses?

FILTERS → **REPORTS** NEWS PICTURES VIDEO ALL



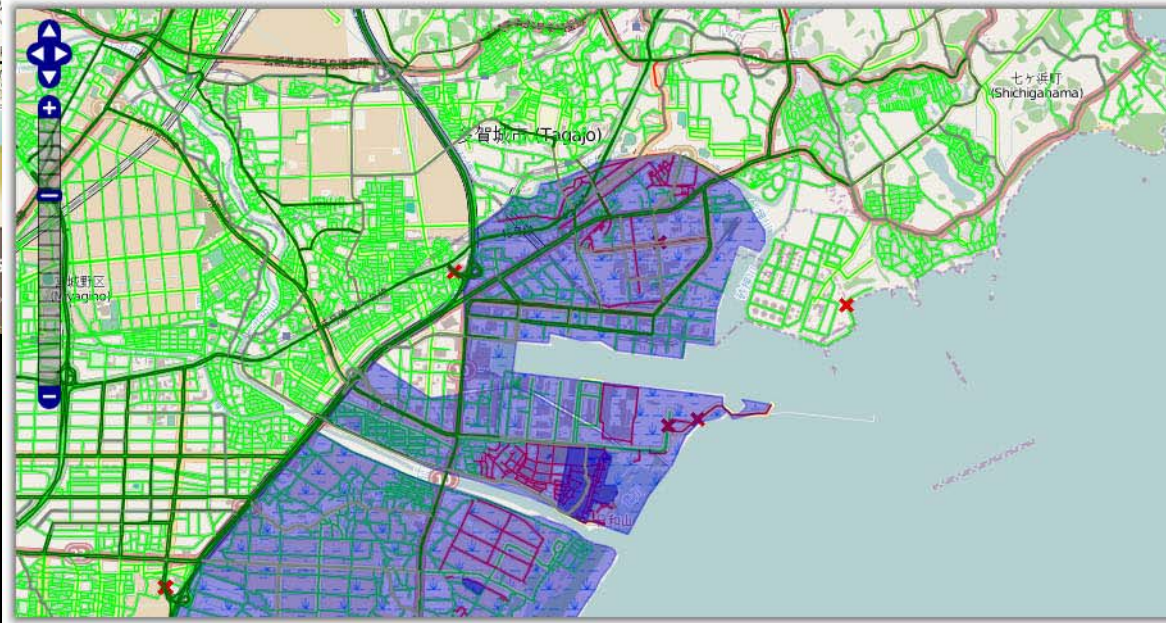
Christchurch GEOCAN

INSTRUCTIONS | GEOCAN | CROWDSOURCING | CONTACT

Tweet Like 95

**tomnod** Disaster Mapper

Help map the damage.



Base Layer

- OpenStreetMap Mapnik
- OpenStreetMap MapQuest
- osm-no-labels
- Bing Aerial

Overlays

- Road Status Japan (OSM) (impassabel=yes)
- Node Barriers Japan (OSM) (barrier=\*)
- Tsunami Damage Japan (OSM) (tsunami:damage)
- Honda Sanriku Layer

[Permalink](#)



# crowd volunteering

## crowd sourcing + coordinated voluntary work

The screenshot displays the SIMAK Merapi web application interface. At the top, there are navigation buttons for 'Register' and 'Login', and a status bar showing 'Code Chapter: Peta-1000 (16.2.11 | 10:02 WIB)'. The main map area shows a satellite view of the Merapi volcano region, with numerous blue and orange triangular markers indicating data points. A white circle highlights a specific area on the map. The sidebar on the right contains a 'Legenda' (Legend) section with buttons for 'Layer', 'Pardala', and 'Posko'. Below this, there is a 'POSKO' section titled 'Damage-Loss Assessments' with three entries: 'Posko Setelah 19 November' (Luasan (0), Titik (138), download kml), 'Posko Setelah 26 Oktober' (Luasan (0), Titik (41), download kml), and 'Posko Setelah 5 November' (Luasan (0), Titik (378), download kml). The sidebar also includes 'Lapis Data Dasar' (Basic Data Layers) and 'Lapis Data Tematik' (Thematic Data Layers) sections, each with several data layers and 'Download' buttons.

Register Login Code Chapter: Peta-1000 (16.2.11 | 10:02 WIB)

Map Satellite Hybrid Terrain

HIDE DATA

Legenda Layer Pardala Posko

**POSKO** Damage-Loss Assessments

- Posko Setelah 19 November  
Luasan (0), Titik (138), [download kml](#)
- Posko Setelah 26 Oktober  
Luasan (0), Titik (41), [download kml](#)
- Posko Setelah 5 November  
Luasan (0), Titik (378), [download kml](#)

**Lapis Data Dasar**

- Desa Masuk Radius Ancaman Per 19/11 [Download](#)
- Gunung [Download](#)
- Sungai Utama [Download](#)

**Lapis Data Tematik**

- KRB Merapi Pre Erupsi 2010 (sumber:BPPTK) [Download](#)
- Ancaman Tanah Longsor (sumber:Dir. Geologi) [Download](#)
- Ancaman Banjir Lahar Dingin (sumber:PU) [Download](#)
- Demografi [Download](#)
- Lokasi Cek Dam Sabo (sumber:PU) [Download](#)
- Kualitas Posko [Download](#)
- Zona Terdampak Erupsi(Sumber: Citra SPOT5) [Download](#)

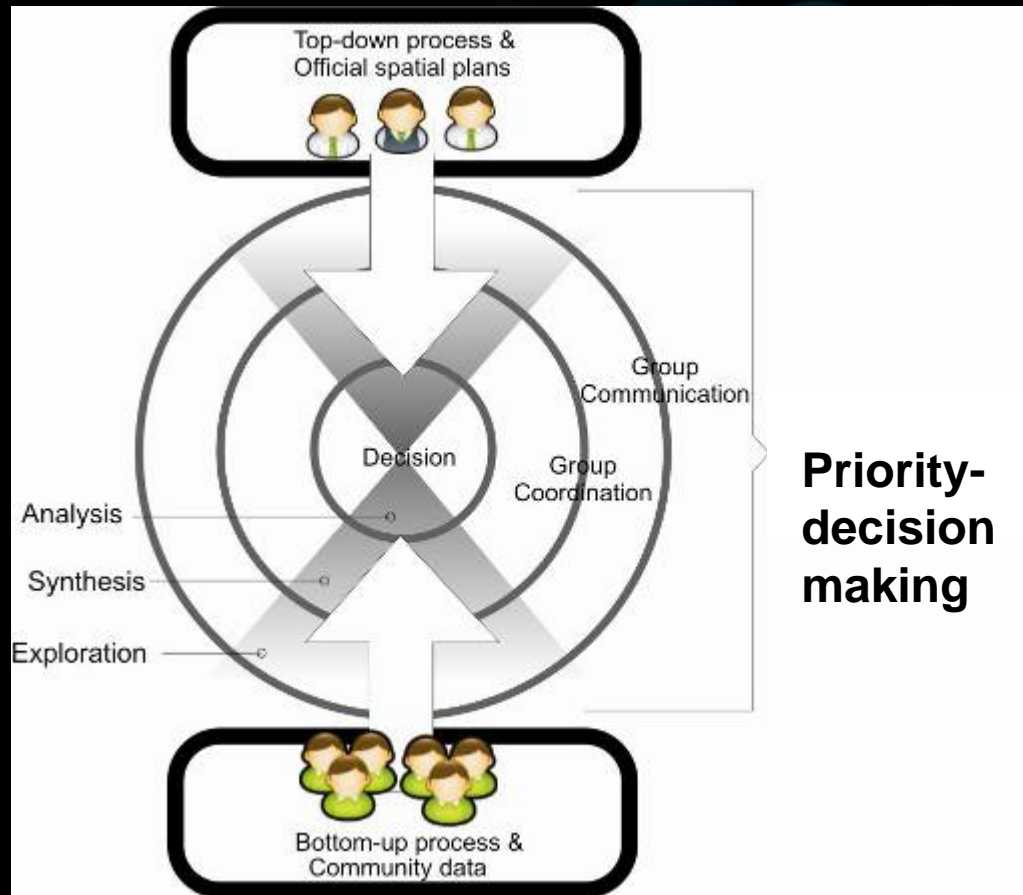
SIMAK Merapi

# Motivation

- Information System for Community Action during Merapi Crisis
- Background:
  - needs for documenting crisis situation
  - needs for visualizing response activities
- Motivation:
  - Emergency information is required BUT has to deal with broad spatial layers
  - has to deal with broad initiatives / participation



# Idea: Data & Information for Crisis Management





# About the System

## Features:

- Visualizing Internally Displaced People Camps & Logistics
- Visualizing Stakeholders Role: Who Does What
- Uploading Field Survey & Participatory Mapping Results
- Facilitating Participatory Damage & Loss Assessments
- Producing KML for BNPB's use

<http://merapi-partisipasi.ugm.ac.id>

# About the System

Peta Partisipatif Forum PRB  
Lokasi Posko, Bantuan, dan Info Spasial Seputar Merapi

Code Risk Mapping Chapter

Register Login Code Chapter: Kisanan Kerugian Pemukiman CODE (Yogyakarta) (16.2.11 | 08:56 WIB)

Map Satellite Hybrid Terrain

SHOW DATA

**Numbers of Persons Needs' Assessments for each sector Who does what**

**Balai Desa Caturharjo**  
Last update: 27 Nov 2010 13:17 WIB  
No Reg Posko: 34041304  
Posisi (lat/Ing): -7.768551/110.32804  
Alamat Posko: Dusun Caturharjo, Kelurahan , Kecamatan , Kabupaten Sleman  
Contact Person:

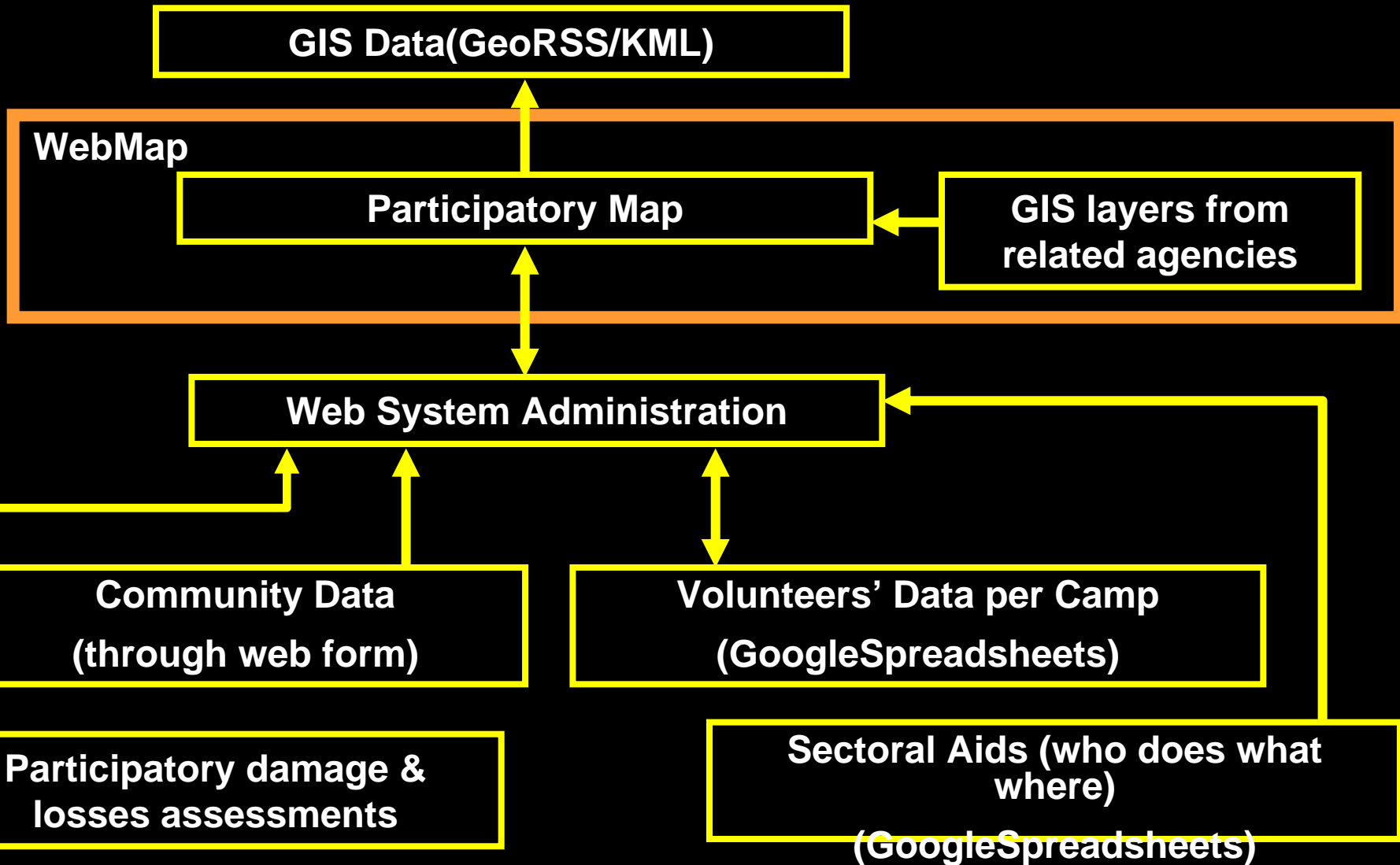
**Data Pengungsi**

DETAIL	JUMLAH	
	Laki-laki	Perempuan
Balita	0 orang	0 orang
Anak2	63256 orang	64664 orang
Dewasa	67539 orang	68085 orang

Windows taskbar: Done, 7:40



# Data Flow



# Reporting Form

The screenshot displays a web interface for reporting a disaster relief shelter (Posko). The background is a map of Boyolali, Indonesia, with various districts and landmarks labeled. A white form window is overlaid on the map, containing the following fields and options:

- Buttons:** Edit Account, Logout, Code Chapter: Daerah Terdampak Lahar Dingin Wilayah Boyolali (16.2.11 | 12:58 WIB)
- Map Controls:** Posko, Pordala, and navigation tools (compass, zoom in/out, pan).
- Form Fields:**
  - Lat:
  - Lng:
  - Info | **Logistik** | Kesehatan | Infratuktur | Pendidikan | Keamanan
  - Nama Posko:
  - No Reg Posko:
  - Kategori:
  - Status:  Awan Panas  Lahar Dingin
  - Dusun:
  - Kelurahan:
- Map Labels:** Pakis, Gunung, Ampel, Bandongan, Magelang, Mertoyudan, Tempuran, Mungki, Borobudur, Ngluwar, Samigaluh, Kalibawang, Sieman, Ngemplak, Manisreng, Karan, Japen, Karan, Kluon, Tenga, Seyegan, N...



# Qualitative Report



# Damage & Losses Reporting

The screenshot shows a web application interface for disaster damage reporting. At the top, there are navigation links for 'Edit Account' and 'Logout', and a status bar indicating the user's location and time: 'Code Chapter: Kisan Kerugian Pemukiman CODE (Yogyakarta) (16.2.11 | 08:56 WIB)'. The main area features a map with a 'Pardala' layer selected. A 'HIDE DATA' button is visible above the map. A data entry form is open, displaying the following fields:

- Lat: 7.7062285731296685
- Lng: 110.46272277832031
- Nama Pardala: [Empty field]
- Kategori: Pemukiman (dropdown menu)
- Status:  Awan Panas  Lahar Dingin
- Dusun: [Empty field]
- kelurahan: [Empty field]
- Kecamatan: [Empty field]
- Kabupaten: [Empty field]
- Kerugian: [Empty field]

The legend on the right side of the interface is organized into several sections:

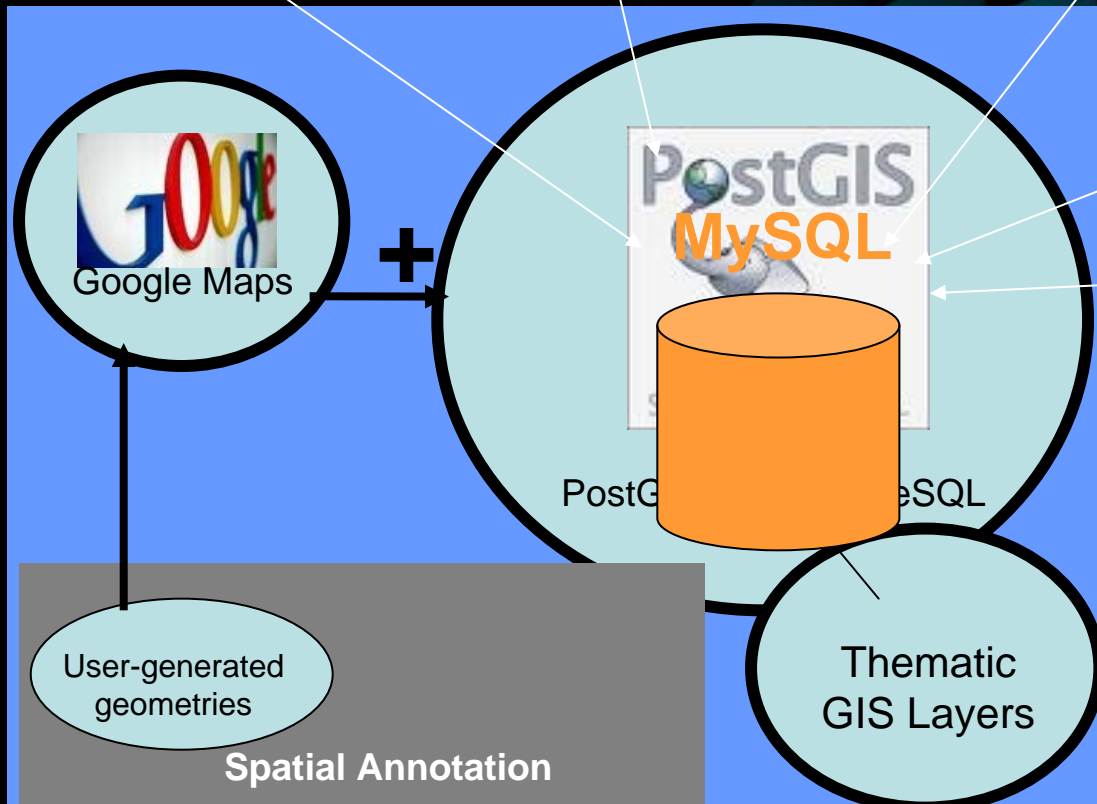
- Kawasan Rawan Bencana (KRB) Lama:** KRB 1, KRB 2, KRB 3, Ancaman Debris.
- Lokasi Sapo (Cek Dam):** Represented by a blue downward arrow icon.
- Ancaman Tanah Longsor:** Rendah (yellow), Sedang (orange), Tinggi (brown).
- Posko:** Posko Sebelum Erupsi 5 Nov (green), Posko Pasca Erupsi 5 Nov (blue), Marker Partisipasi (green pin).
- PARDALA:** Pemukiman (green), Pertanian (light green), Perikanan (light blue), Peternakan (yellow), Sanitasi dan Air Bersih (light blue), Jalan & Jembatan (orange), Sungai & Irigasi (blue).



**Video mapping**

**SF Fotogrametry**

**Participatory DALA**



**3W mapping**

**Camps' Mapping**

# Further Developments – Data Collection



Camps

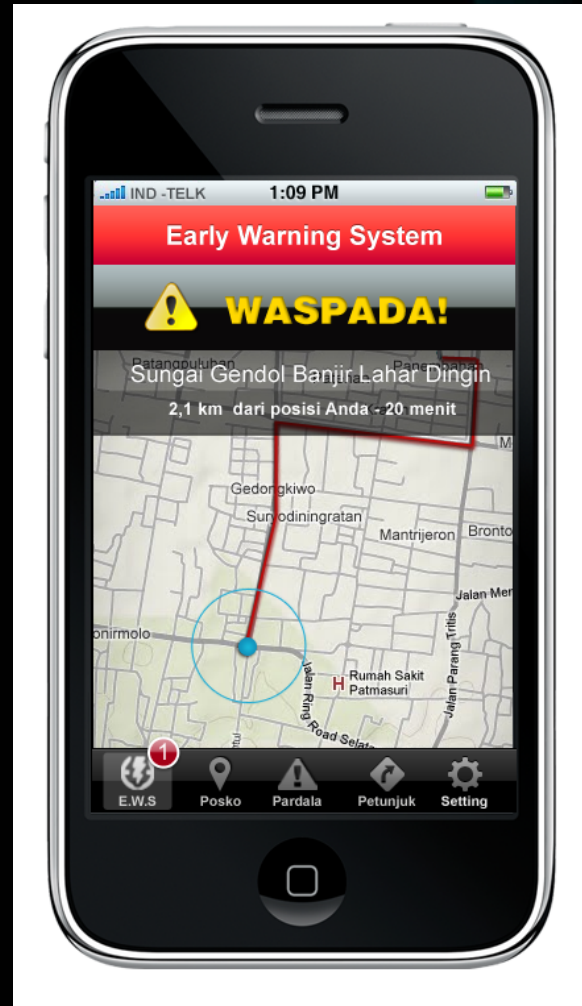


Damage & Losses Reporting

Field Data Collection using Mobile Form

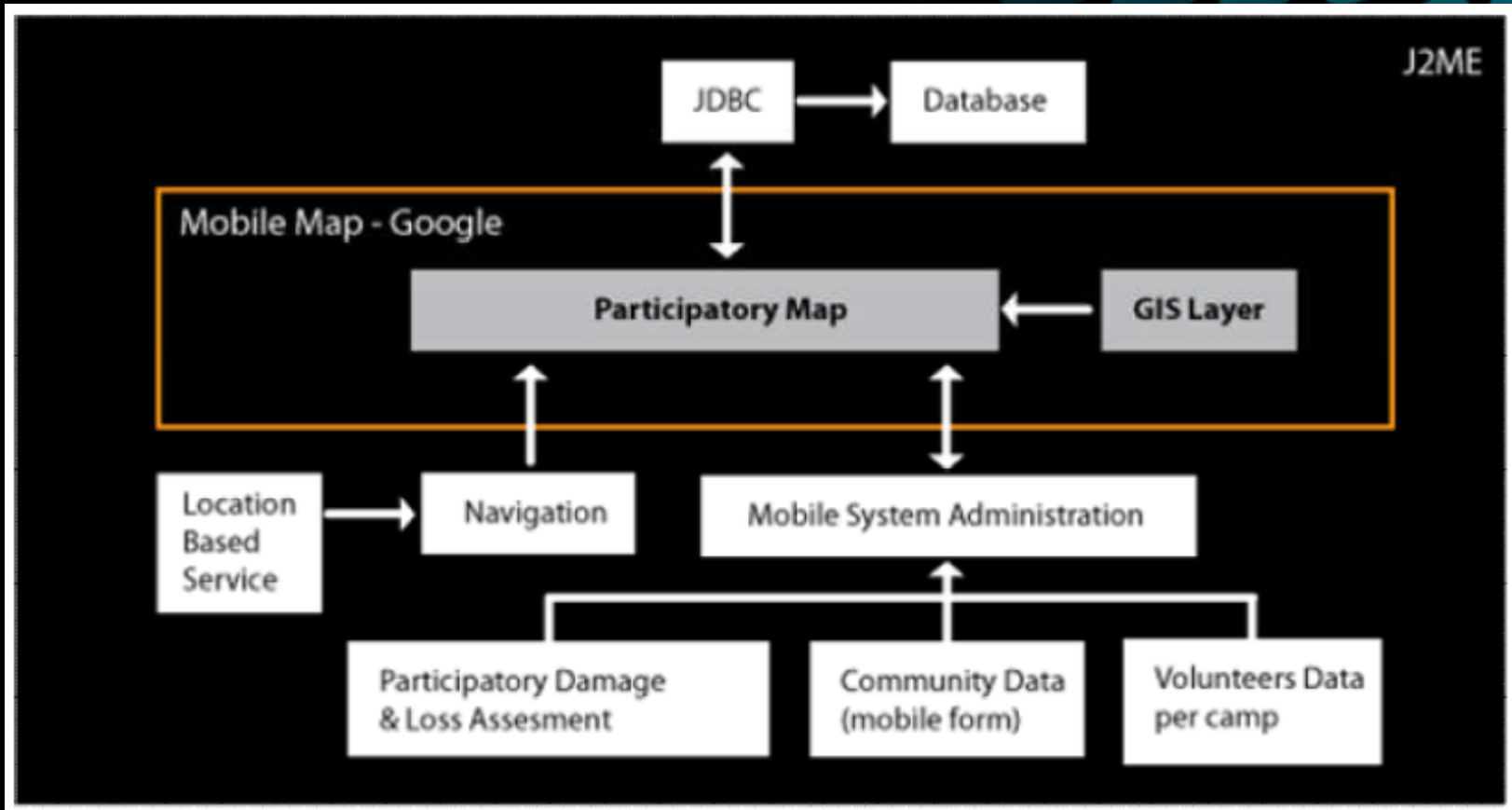


## Further Developments – Extras



Early Warning – Secondary Disaster (Debris Flood)

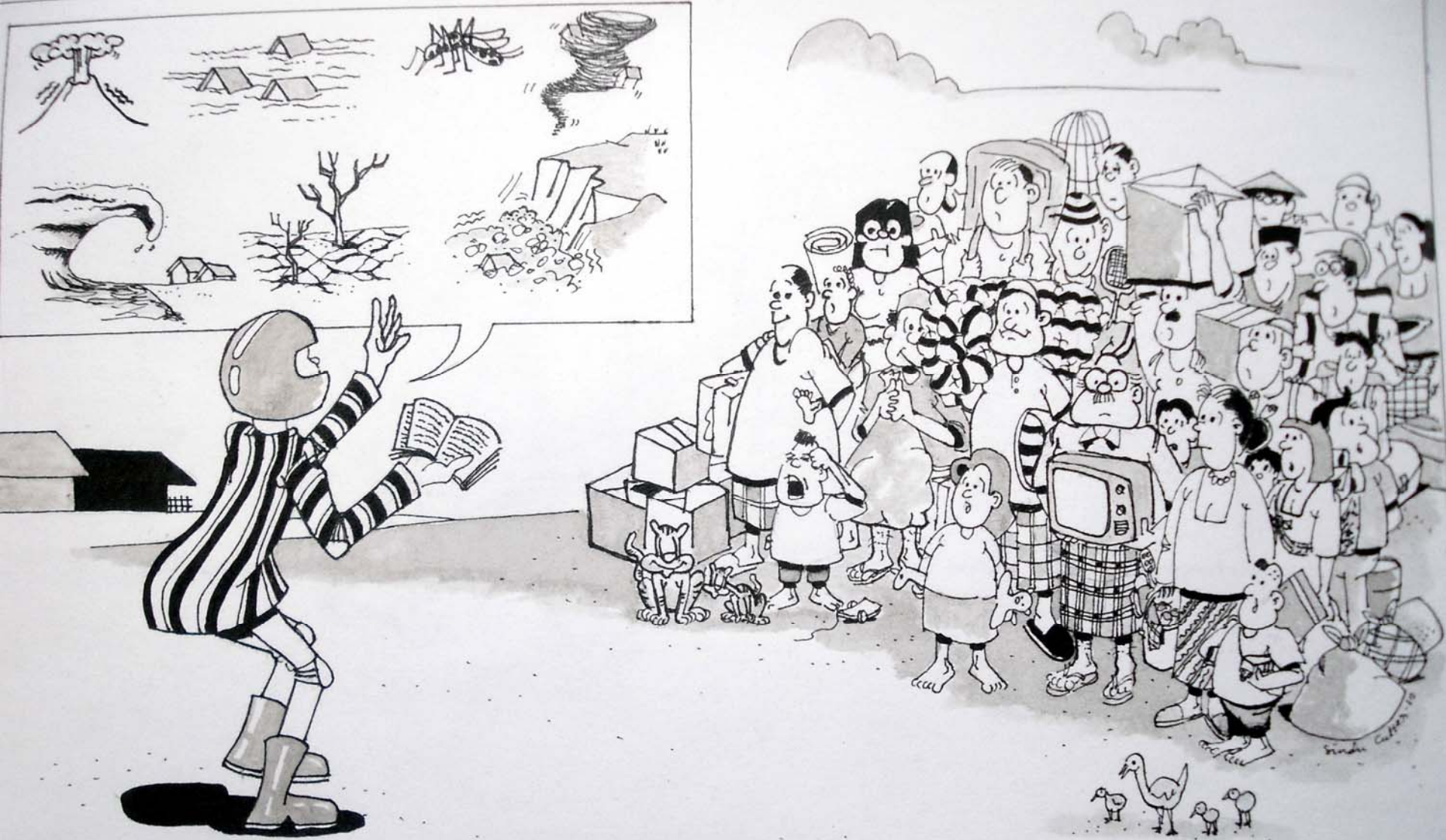
# Extended to Mobile App





# Lessons-Learned

- The initiative involved more than 300 hundreds data collector volunteers that are down-streaming data related numbers and conditions of IDP camps through a web geoportal that mainly provides three main features: **data visualization of relevant agencies to the event, progress and conditions of IDP camps, and participatory damage and loss assessments.**
- The updateness and accuracy is still issue: need to provide not only usable guidance to volunteers but also tailor-made short tutorial
- Lessons-learned: Community-based data acquisition and participation are context-dependent where maps can be of useful tool to assist coordination and partisipation



**PREVENTIVE IS BETTER THAN RESPONSIVE**



# Thank you

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[www.geodesi.ugm.ac.id](http://www.geodesi.ugm.ac.id)

[www.ugm.ac.id](http://www.ugm.ac.id)



# Vote of Thanks

- Didik S. Mulyono (Oxfam)
- Agung Subroto (ECC FT –UGM)
- IOM
- OCHA & team
- Relawan Forum PRB & SMBM
- Jalin Merapi Twitter
- Tim Mahasiswa SIMAK Merapi TGD UGM
- BNPB, FPRB and more: Pak Wisnu, Mas Lilik, Pak Banu, Pak Juli, Pak Danang atas provokasinya