

# Sediment Disasters and Mass Movement

- Progress and application -






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- **Main goals of the theme**
- **Issuance of warning**
  - Identification of disasters
- **Improvement of capacity**
  - ODA project in the Philippines
- **Disseminating information**
  - Safety map
  - Life friendly safety services

# Main goals of the theme

- Develop the **Integrated Management Platform** on sediment disasters
  - Connecting with;  **System**
  -  **Policies**
  -  **International cooperation**
- Three perspectives
  - Issuance of warning
  - Improvement in capacity
  - Optimization of disseminating information

# Issuance of warning

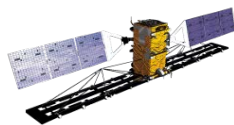
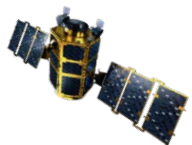
- Collect, review, and develop assessment tools
- Invent warning technologies based on adaptive concepts
- Generate risk map

[Output]

**Guidance materials** for implementation of risk management tools for identification, reduction, and evacuation

[Current]

Identify the disasters



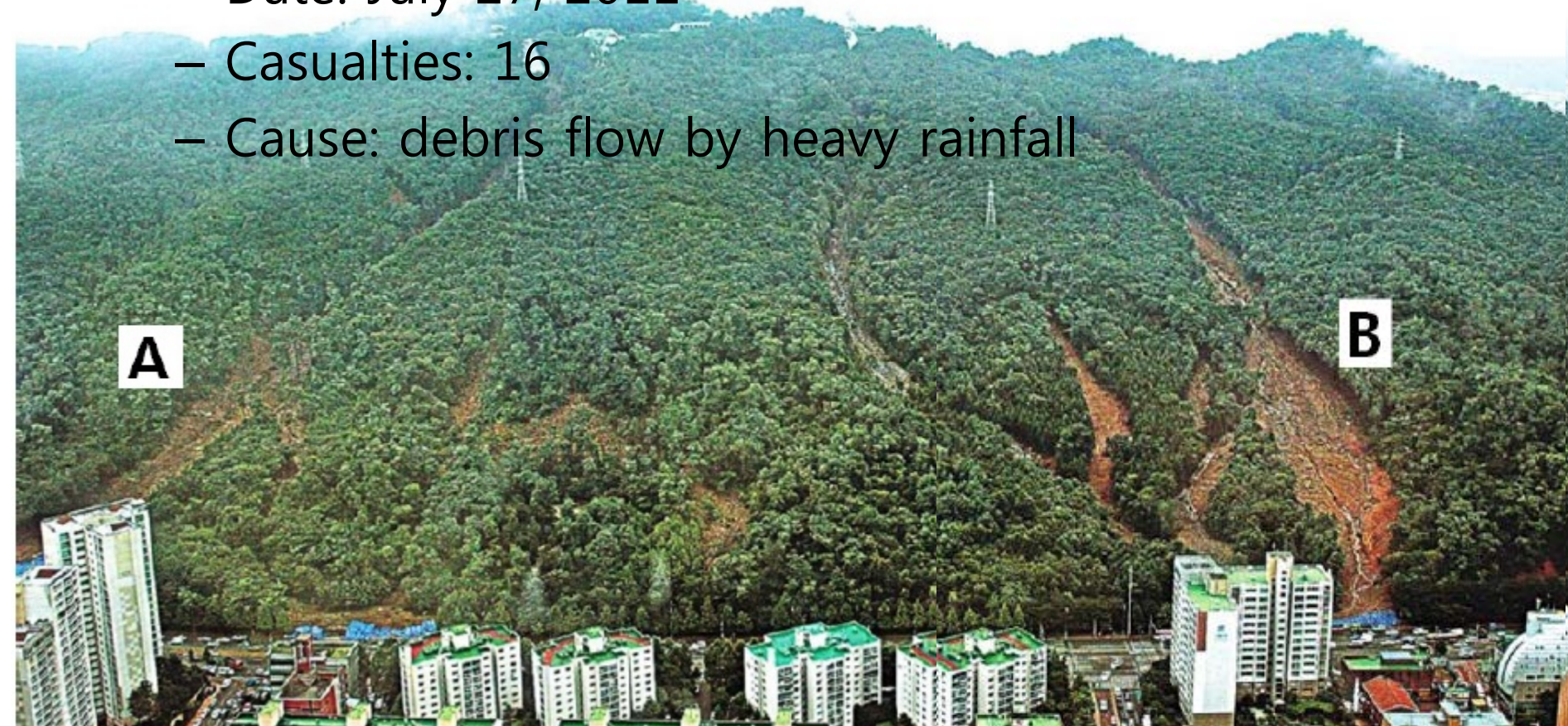
[Nationwide]



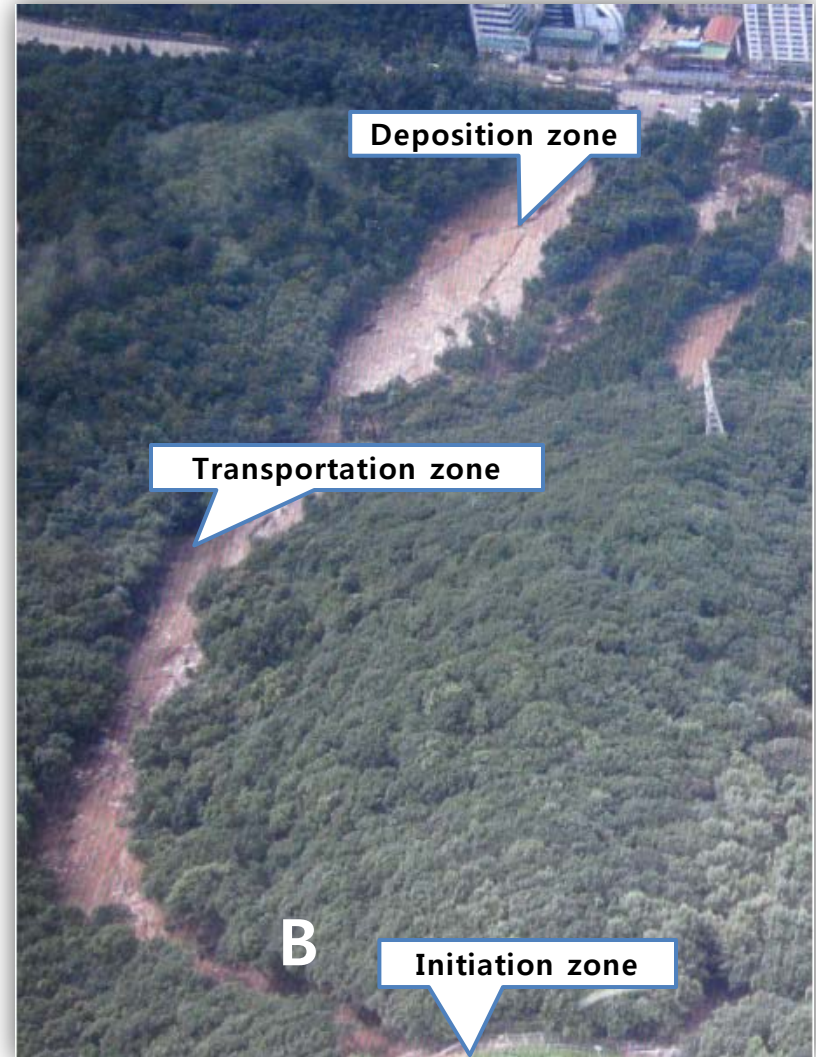
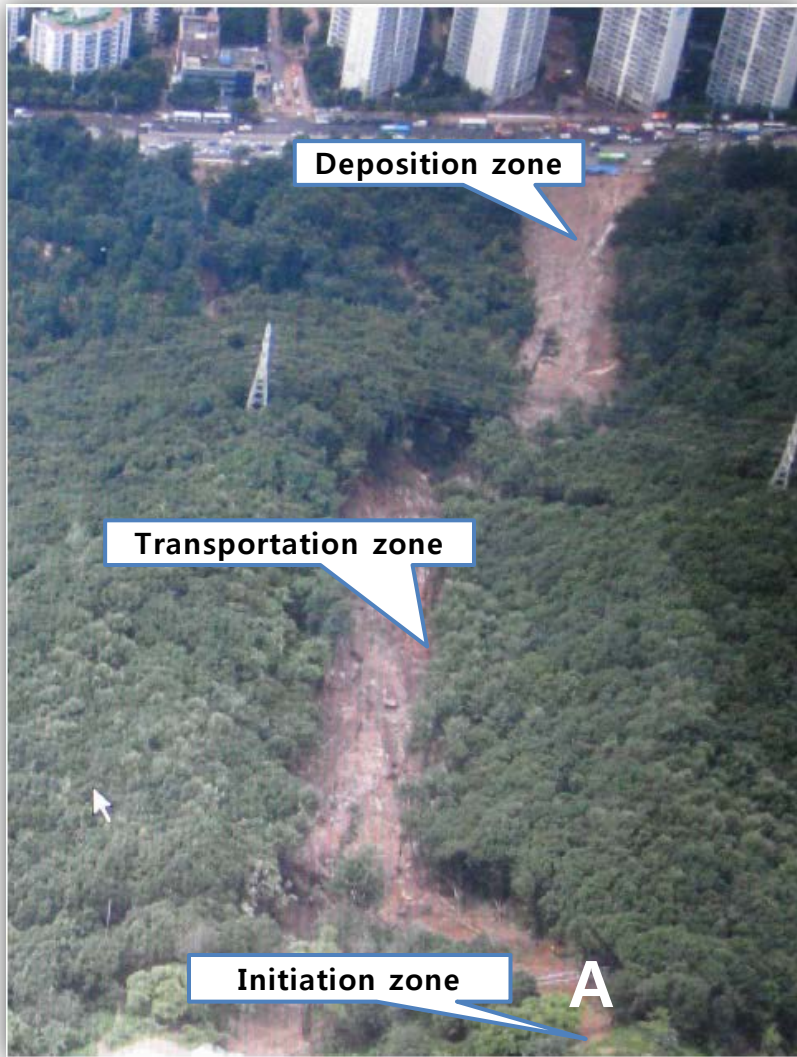
[Local based]

# Identification of disasters

- Landslide in Mt. Umyeon (2011)
  - Date: July 27, 2011
  - Casualties: 16
  - Cause: debris flow by heavy rainfall



# Identification of disasters



# Identification of disasters



# Identification of disasters

- Identification of landslides
  - Satellite system
  - Real-time Aerial Monitoring System
  - Micro UAV system
  - Terrestrial LiDAR system



Real-time Aerial Monitoring System



Micro UAV (MD4-1000)



Leica Scanstation 2

Trimble GX

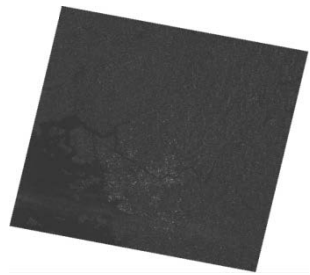
Trimble CX

Terrestrial LiDAR system

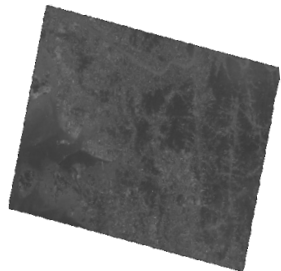


# Identification of disasters

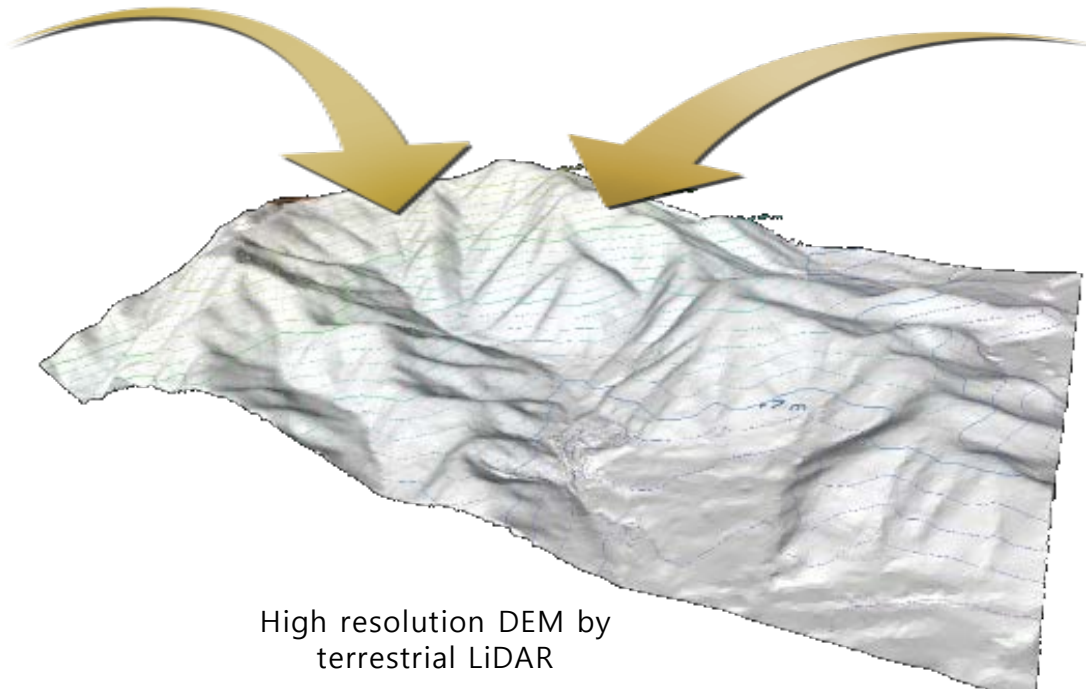
- Acquiring information



Radarsat-1  
(Pre-disaster)



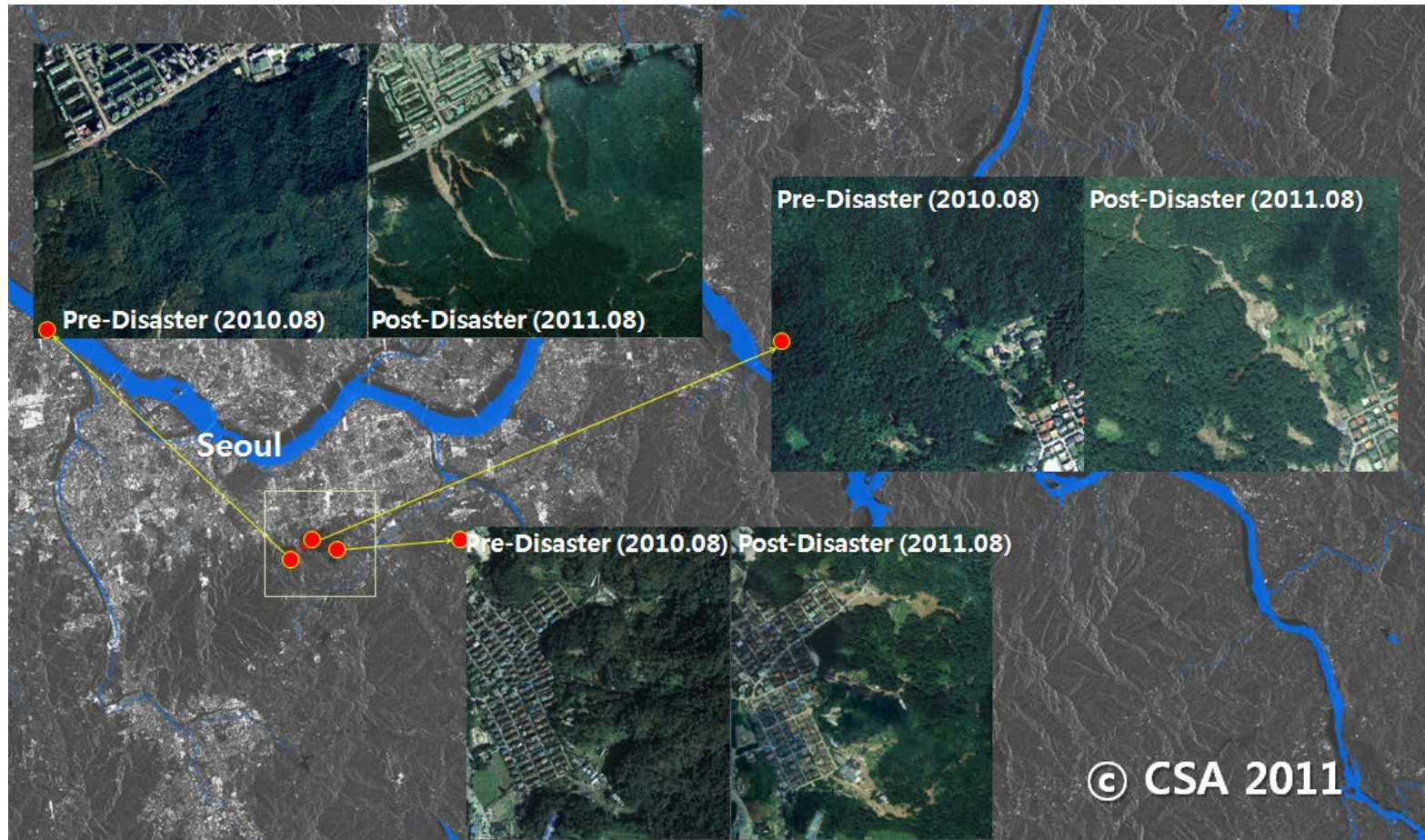
Radarsat-1  
(Post-disaster)



Landslide path through  
the flight path

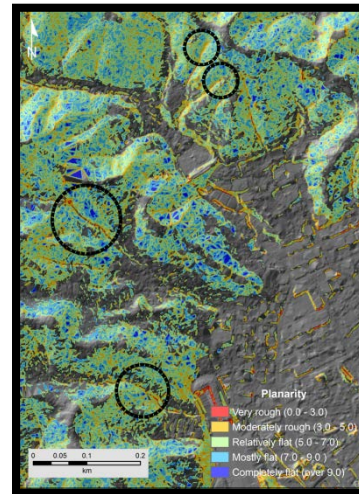
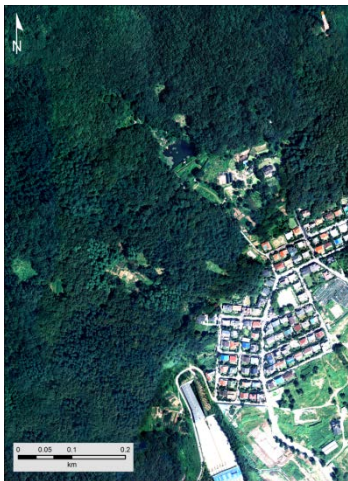
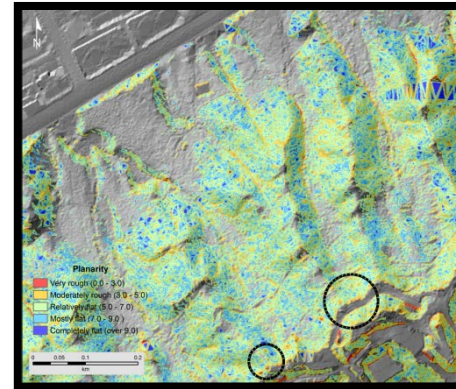
# Identification of disasters

- Analyzing information



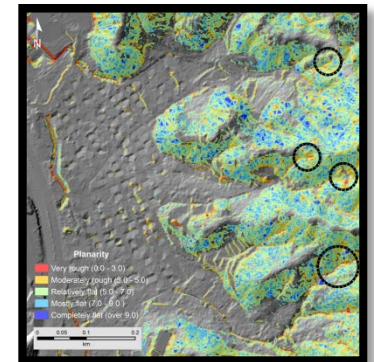
# Identification of disasters

- Producing hazard



How can we increase capacity?

**NEXT!**



# Improvement of capacity

- Attend seminars
- Share & bring technologies to other countries
- Cooperate other int. organizations

[Output]

**Workshop & ODA projects**

[Current]

Implement NDMI's  
ODA projects



# ODA project in the Philippines

- Based on Phases

ARWS: Automatic Rainfall Warning System

FFAS: Flash Flood Alert System



## Schedule

### Phase 1 (2013)

- Choice of Pilot Area
- Construction of ARWS
- Construction of FFAS and calibration
- System Education

### Phase 2 (2014)

- Construction of additional ARWS
- Advancement of FFAS
- River Survey
- Hydraulic & Hydrological Analysis
- System Education

### Phase 3 (2015)

- Advancement of ARWS
- Establishment of Disaster Prevent Master Plan
- Pre-feasibility study on Iponan River



## Direction

**1** Construction of ARWS and FFAS

**2** Construction of additional ARWS and advancement of FFAS

**3** Calibration of ARWS and FFAS

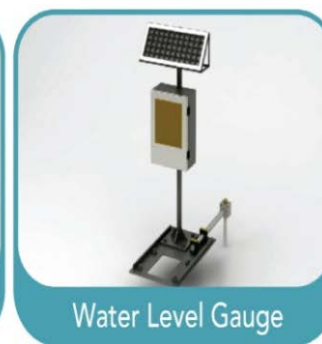
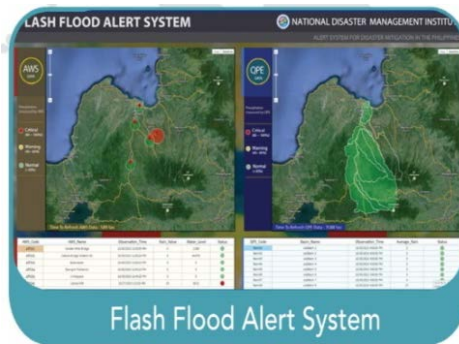
**4** Hydraulic & Hydrological Analysis

**5** Risk Map through risk analysis for Flash Flood

**6** Establishment of education and PR plan for related public officers and experts

# ODA project in the Philippines

- Applied systems
  - Designed to forecast the occurrence of flash flood in advance by real-time monitoring



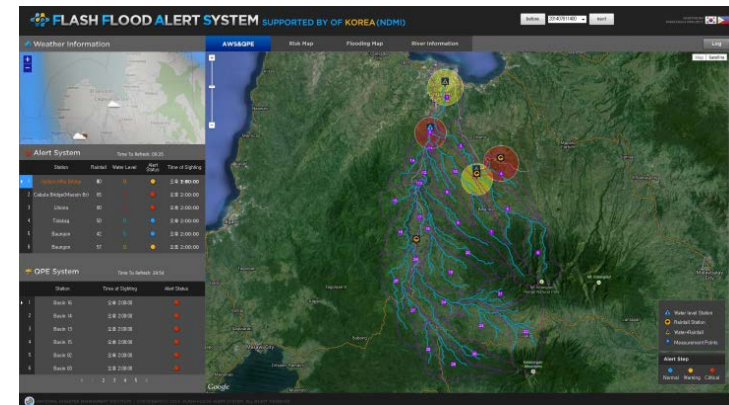
- Expected outcomes
  - Provides information on sudden local torrential rain and subsequent disasters

# ODA project in the Philippines

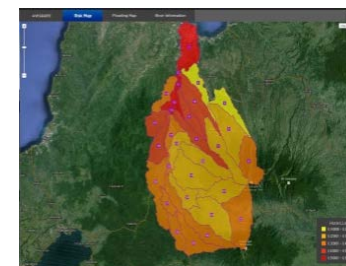
- Results
  - Flash Flood Alert System (FFAS)



Cross-section Survey (Total 8 sites)



FFAS's Main Screen



Flooding Map

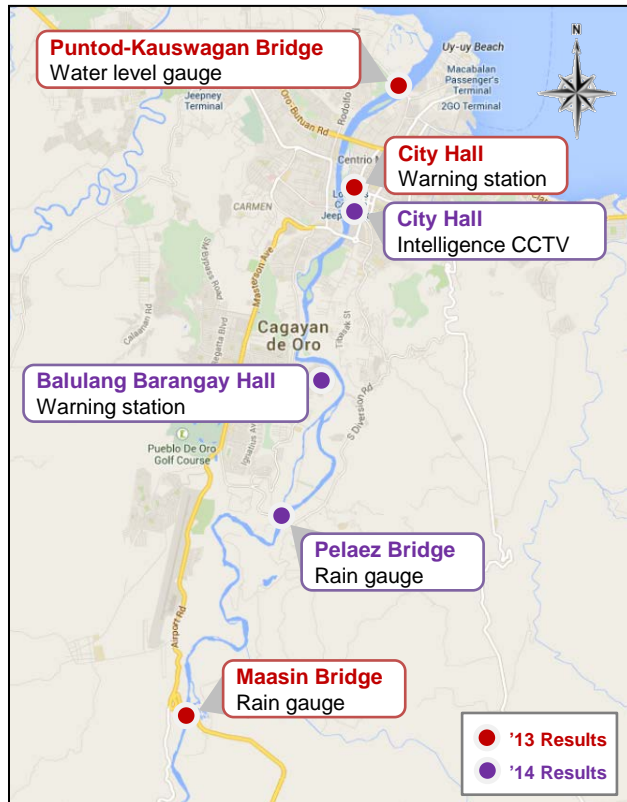
## Warning criteria

- **Critical: over 70 %**
- **Warning: 50-70 %**
- **Normal: less 50 %**

# ODA project in the Philippines

- Results
  - Automatic Rainfall Warning System (ARWS)

[Flooding map]





# Disseminating information

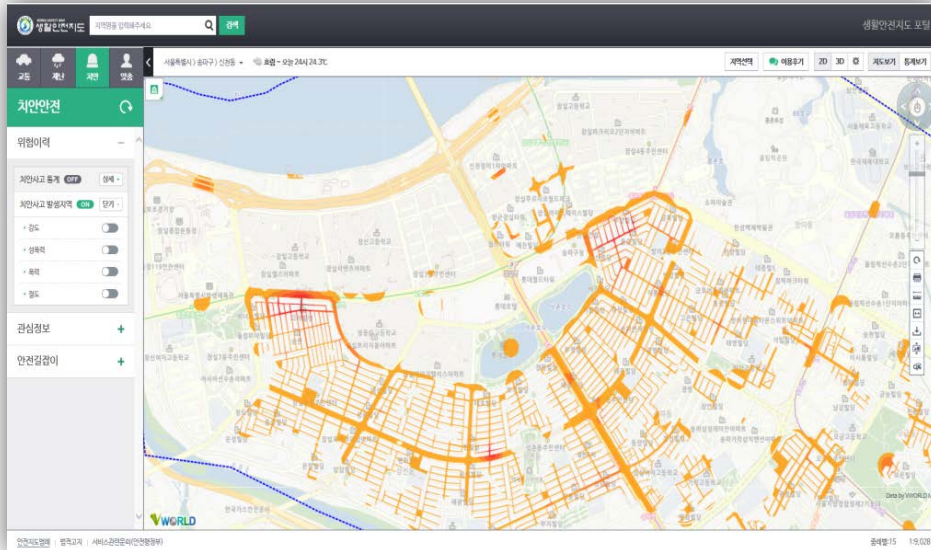
- Distribute related information

[Output]

**Standard Operation plans to public and media**

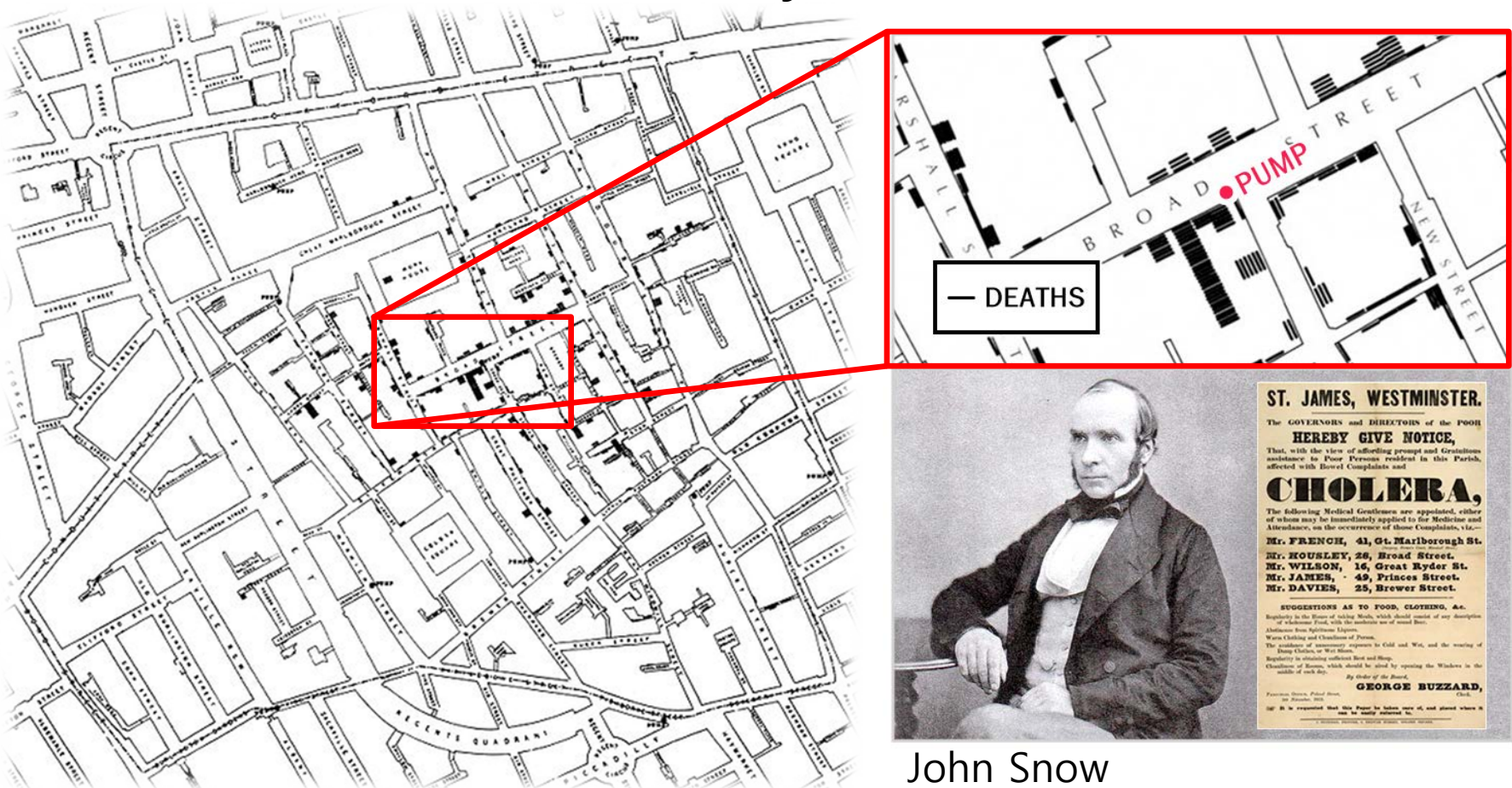
[Current]

Launch the **safety map**  
Promote **safety services**



# Safety map

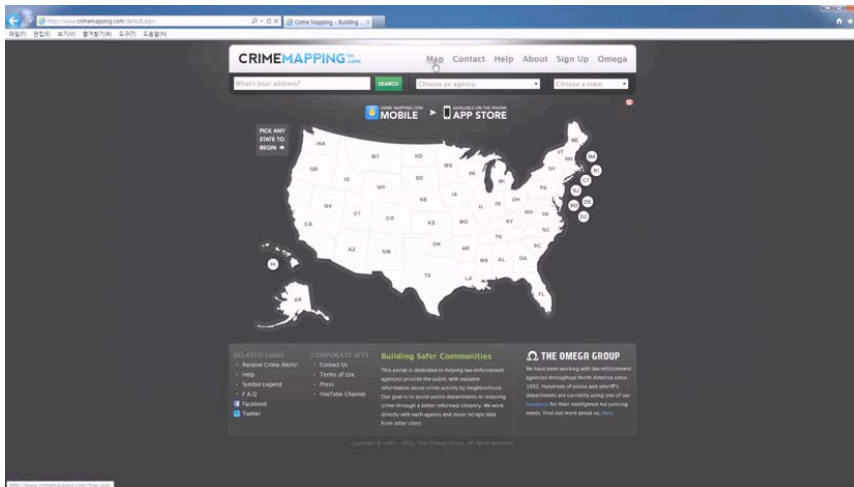
- Past (Brilliant work by John Snow, 1854)



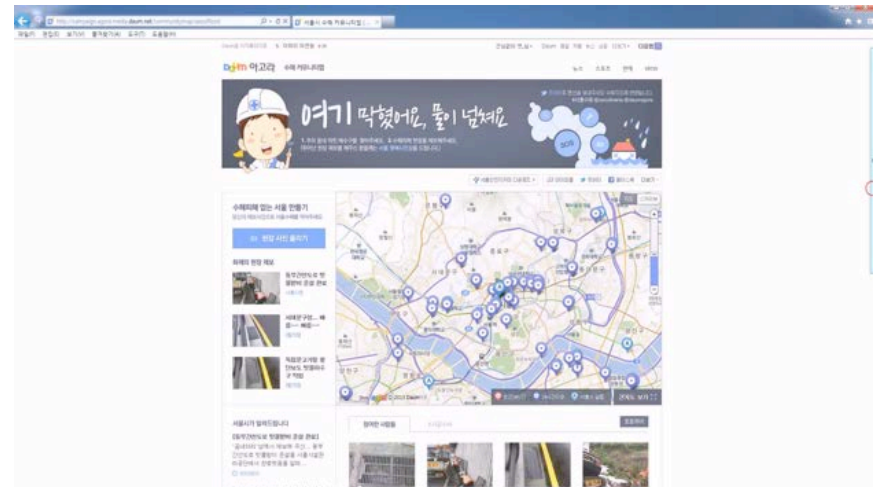
John Snow

# Safety map

- Current



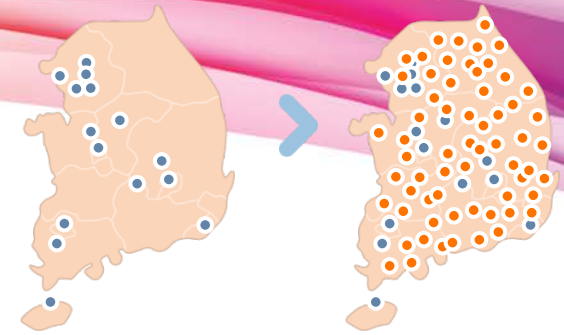
Crimemapping.com (US)



Community Map for Flood Disaster Reduction (Kor)

**Map, Solution for Understanding Social Problems  
Easy, Simple and Powerful!!**

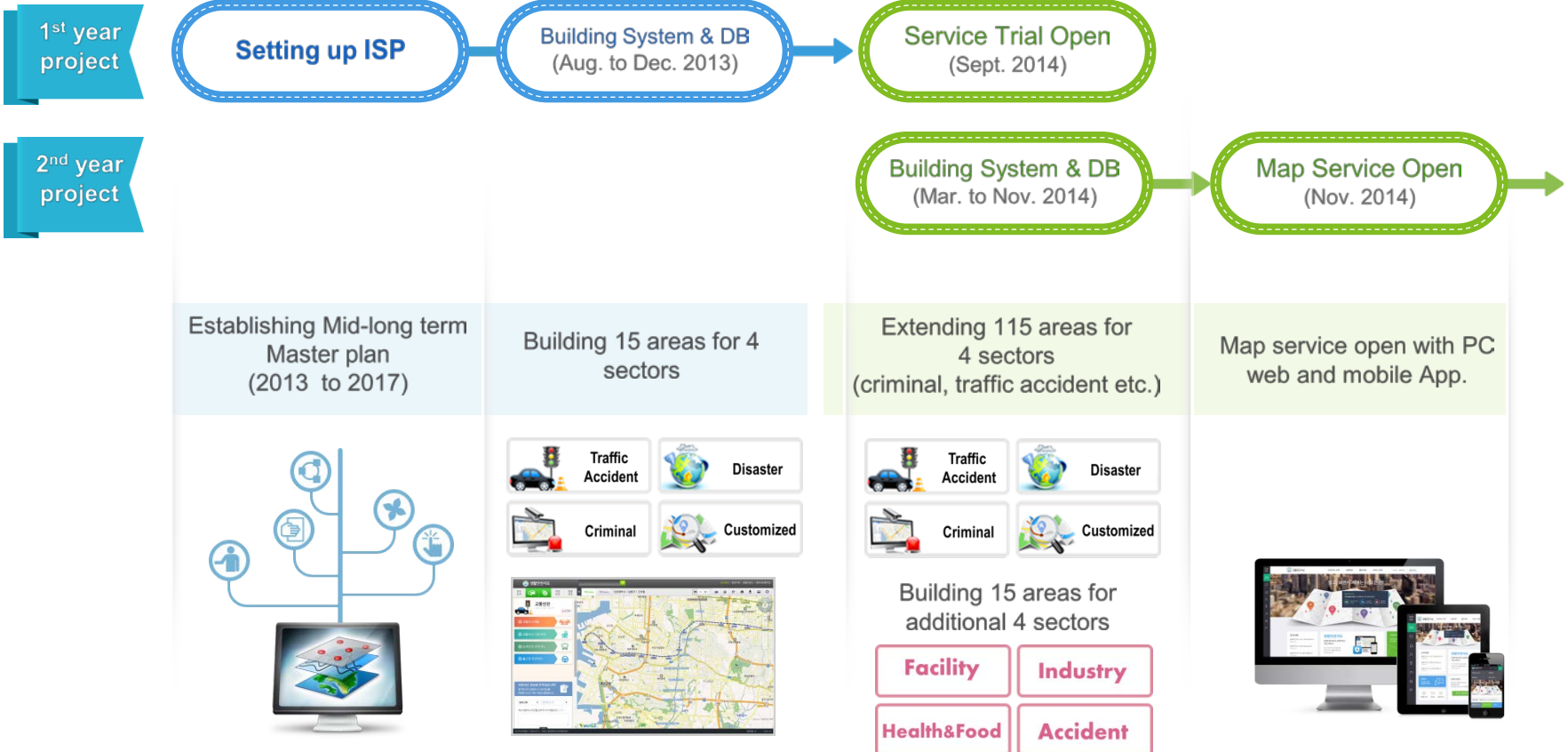
# Safety map



## • Making the Safety map

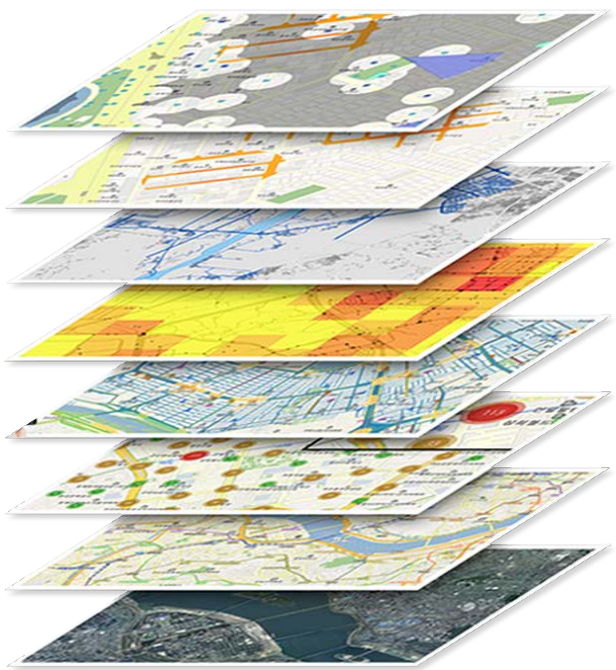
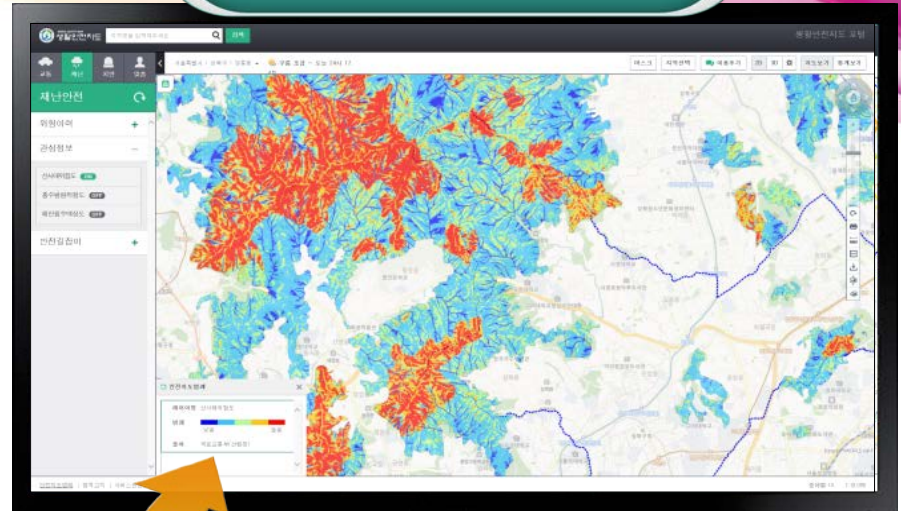
2013

2014



# Safety map

- DBs and display



- Traffic accident
- Disaster
- Criminal
- Customized

Landslide/Earthquake occurrence data

Fire occurrence statistical data

Traffic accident statistical data

High-traffic accident occurrence area

High-crime area for children

High-crime area targeting at women

⋮

**98 Map Layers!!**

# Safety map

- Device-driven map service

[www.safemap.go.kr](http://www.safemap.go.kr)

Applicability to  
Any Device!

(PC Web, Mobile App.)



# Promote safety services

- Life friendly safety services

Many unexpected disasters



Increase the possibility of survival



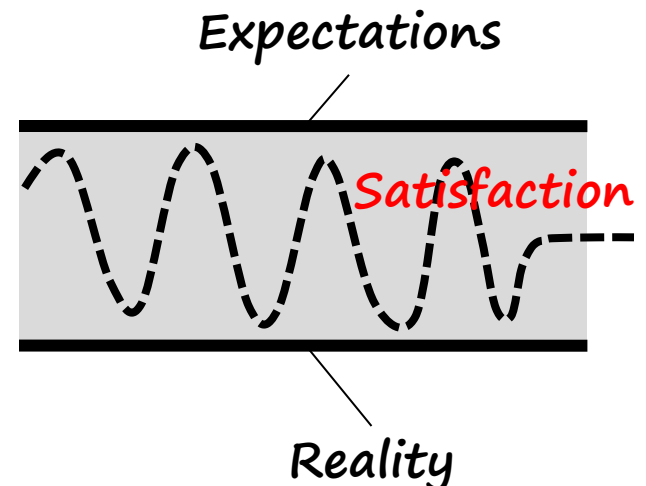
Intuitive actions for rapid evacuation from disasters



Simulation of real disaster situation



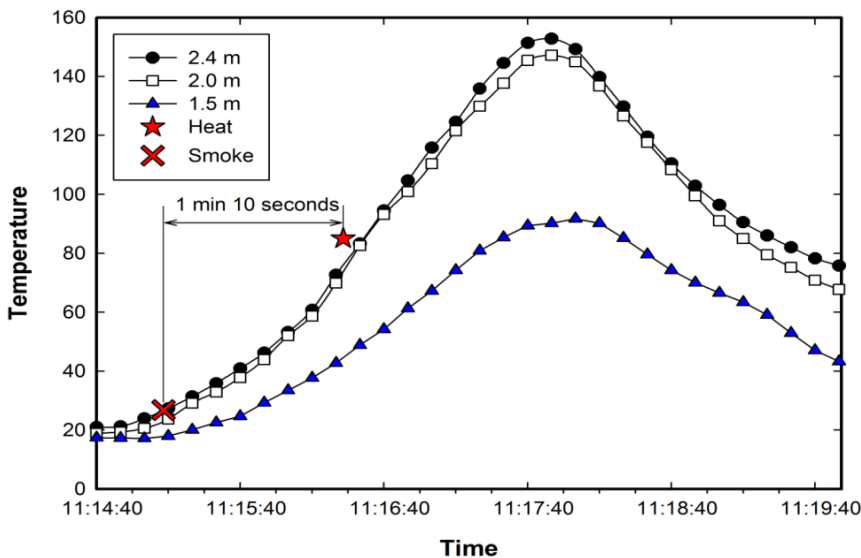
**Generate intuitive guidelines**



# Promote safety services

## • Examples

### Fire detection



Note	Smoke detection	Heat detection
Time (sec.)	29.1	100.7
Temp. (deg.)	26.8	85.0
	1' 10" difference s	

### Underground evacuation



- Flow vel. : side < center
- Threshold of WD to rapid evacuation: **→ knee**
- Threshold of WD to opening the door: **→ 40 cm**



# Promote safety services

- Media Promotions



# Thank you for your attention!



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