ICT in Disaster Management Initiatives in Asia-Pacific

Workshop on ICT for Promoting Inclusive and Disaster Resilient Development

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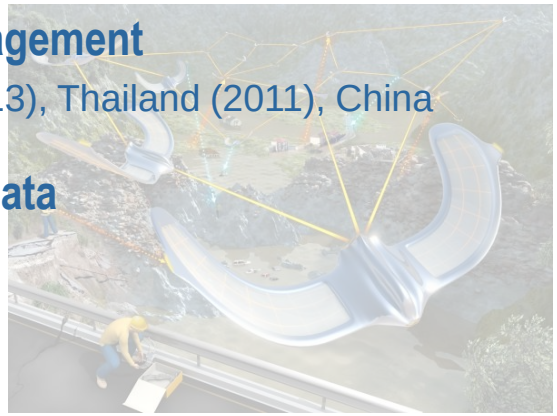
Key Findings & Main Conclusions

ICTs in DRR and Disaster Management until recently:

- GIS and geospatial information and knowledge management
- Analysis of remote sensed (mostly space-based) imagery and data
- Information management to coordinate people & resources

Innovative Applications:

- **ICT for Education & Training**
  - Virtual Reality; Games: Thailand (UNESCO)
- **UAVs (Humanitarian Drones) in disaster management**
  - Nepal (2015), Vanuatu (2015), Philippines (2013), Thailand (2011), China
- **Crowdsourcing of social media and Internet data**
  - Nepal (2015), Vanuatu (2015), Philippines
- **Disaster Robotics on the rise**
  - Japan (2011): as conduits & for exploration



ICT in Disaster Management: 4 Phases

- **Mitigation:** Minimizing the effects of disaster
  - Examples: building codes and zoning, *vulnerability analyses, public education*
- **Preparedness:** Planning how to respond
  - Examples: preparedness plans, *emergency exercises and training, early warning systems*
- **Response:** Efforts to minimize the hazards created by a disaster
  - Examples: search and rescue *(robotics), crisis mapping, information management*
- **Recovery:** Returning the community to normal state
  - Examples: temporary housing (*rapid prototyping technologies*); grants; medical care

ICT in Disaster Management: Main categories

- **ICT Infrastructure:** Augment or replace damaged main communication infrastructure
  - Examples: mobile, deployable units; TVWS (TV White Space), satellites
- **Information management**
  - Examples: Sahana, Ushahidi, ArcGIS, Humanitarian ID
- **Remote Sensing & geospatial information**
  - Examples: Satellite based, Drones, Philippine DOST's NOAH project
- **Data analysis using social media and crowdsourcing approaches**
- **Disaster Robotics and Rapid Prototyping**

Crowdsourcing & Social Media 1: Overview

- **What**
  - Community generated data, exchanged on the Internet in online social communities as pictures, messages and tweets can provide critical information for crisis mapping and situational awareness building through the analysis of such crowdsourced data

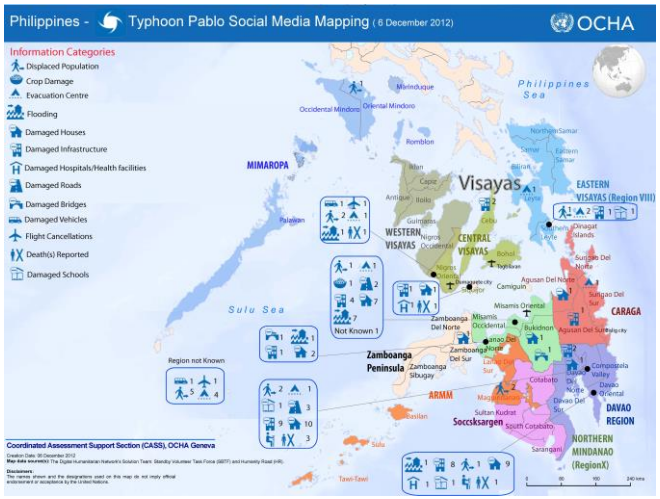
- **Why**
  - During a disaster, the affected community, response agencies and governments must all quickly understand who is in need, where they are, what is needed, which agencies can supply the demand, safe routes, distribution and medical centers etc.
  - Crowdsourcing constitutes a quick, efficient, cost-effective and high-quality solution to this problem

- **Who**
  - Digital Humanitarian Network DHN
  - Humanitarian OpenStreetMap Team HOT
  - The Standby Task Force SBTF
  - The International Network of Crisis Mappers

Crowdsourcing & Social Media 2: Use Cases

- **Nepal 2015**
  - Main objective is to crowdsource the analysis of tweets and media to rapidly assess disaster damage and needs

- **Philippines 2012 and 2013**
  - In 2012, in response to typhoon Pablo, the first time a map entirely sourced from social media analysis was generated. Within 10 hours more than 20.000 tweets were analyzed.



Crowdsourcing & Social Media 3: Lessons Learned

¬ Lessons Learned

- Crowdsourced results (categorized messages/ tweets/ pictures; maps) can be delivered within **hours** after the event of a disaster
- Issues of reliability and quality can be addressed by having multiple volunteers look at the same data
- Effective management of large numbers of volunteers has become a problem itself, but tools to support this have been or are currently developed
- Crowdsourcing in disaster response is still in its early stages, therefore much remains to be learned, for instance better integration into established disaster response mechanisms
- Inclusion of local community and diaspora abroad increases the quality of the output

¬ Outlook

- Still labour-intensive, requiring a lot of manual input ➔ shift to semi-automatic support using AI techniques such as machine learning/ classification
- Transition from crowdsourced text and image data to other data formats such as 3D, topographical data in combination with UAVs

UAVs 1: Overview

- **What**
  - Unmanned aerial vehicles (UAVs, or drones) have been increasingly used for crisis mapping during disaster response as a replacement for traditional aerial imagery collected by planes, helicopters or satellites.

- **Why**
  - UAVs offer a couple of advantages for localized aerial imagery collection or sensing: quickly deployable, high-resolution sensors, efficient and cost-effective

- **Who**
  - UAViators
  - Drone Adventures