The Roles of Satellite Data for Disaster Management in Indonesia

Dody Ruswandhi,
Deputy for Emergency Management
National Agency for Disaster Management, Indonesia

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INDONESIA

- 17,504 islands (1st in the world)
- 81,000 km long coastline (2nd in the world)
- Population 237 million people (4th in the world)
- Mega Biodiversity (10% plants, 12% of mammals, 16% of reptiles, 15% fish, 17% of bird in the world live in Indonesia) – 3rd in the world
- 13% or 129 active volcanoes in the world (1st in the world)
Indonesia is located at 3 main tectonic plates which are active, they are Eurasia, Pacific and Hindia-Australia. The active tectonic process there are many earthquakes, tsunami, volcano eruption and others.
Total shoreline prone of tsunami is about 21,000 Km.
Earthquakes

Aceh, 2004

Nias, 2005

Padang, 2009

Jogja, 2006

Mentawai, 2010
VOLCANOS

- 129 active Volcanos
“........ irony of nature, we stand on the earth's rich natural resources but also prone to natural disasters, ........"
Indonesia’s face of Land and Forest Fire
DISASTERS IN INDONESIA DURING 2002 - 2010

The chart above shows the number of disasters in Indonesia during the years 2002 to 2010. The data is categorized by different types of disasters, including但不限于 KLB, Akci Teras/Sabotase, Konflik/Kerusuhan Sosial, Kebakaran, Kebakaran Hutan dan Lahan, Kecelakaan Transportasi, Kecelakaan Industri, Gelombang Pasang/Abrasi, Angin Topan, Kolera, Banjir, Banjir dan Tanah Longsor, Tanah Longsor, Letusan Gun. Api, Gempa Bumi dan Tsunami, and Gempa Bumi.
BNPB is the Indonesia National Agency for Disaster Management. It was established in 2008 to replace the National Disaster Management Coordinating Board that was established in 1979. BNPB is directly responsible to the President of Indonesia and the chairman is directly appointed by The President.

The Chairman BNPB is Mr. Dr. Syamsul Maarif.
1. GOVERNMENT LAW NO 24 / 2007  
   **DISASTER MANAGEMENT**

2. GOVERNMENT REGULATION NO 21 / 2008  
   **DISASTER MANAGEMENT IMPLEMENTATION**

3. GOVERNMENT REGULATION NO 22 / 2008  
   **DISASTER RELIEF MANAGEMENT & FUNDING**

4. GOVERNMENT REGULATION NO 23 / 2008  
   **INTERNATIONAL & NGO ASSISTANTS IN DISASTER MANAGEMENT**

5. PRESIDENTIAL DECREE NO 8 / 2008  
   **NATIONAL DISASTER MANAGEMENT AGENCY**
Policies

- Strengthen national capability in disaster management, especially in prevention, mitigation, and preparedness
- Manage and mobilize all potential resources (infrastructure and manpower) in disaster preparedness, response and recovery
- Empower local authorities in anticipating and responding to disasters in their regions
- Coordinate all stakeholders and activities in disaster management
- Incorporate Disaster Risk Reduction in the framework of National Development Plan
STRATEGY

- Disseminate DRR and strengthen capacity through Training and Education
- Develop Guidelines and SOP in responding to any type of disaster
- Develop a Disaster Management Information System (DMIS)
- Develop Hazard Mapping and Risk Mapping for Disaster prone areas
- Develop Disaster Management & Contingency Plan for National-Provincial-District levels
- Strengthen National/Provincial/District Emergency Operation Centers and Rapid Response Teams
- Strengthen local capacity in disaster recovery
HYOGO FRAMEWORK

1. Make Disaster Risk Reduction a Priority
2. Know the Risks and Take Action
3. Build Understanding and Awareness
4. Reduce Risk
5. Be Prepared and Ready to Act

Reduce Hazard
Reduce Vulnerability
Increase Capacity

Risk Reduction
PROGRAM PRIORITIES

- Disaster Management Plan
  - Develop Disaster Preparedness Plan and Contingency Plan
- Public Awareness
  - Information, Education, Training and Drilling
- Risk Assessment
  - Hazard, Vulnerability, and Risk Mapping at local level
- Early Warning Systems
  - Monitoring, Analysis, Warning, and Dissemination
- Emergency Operation Center (EOC)
  - Establish EOC at National/Provincial/Distric Levels
- Joint Assessment Guidelines in Emergency Response, in which results can be used by all responders
Risk Reduction Mapping

In 2011 Govt of Indonesia should take all efforts to complete Disaster Risk Mapping by 2015
Risk map

- Hazard
  - type of hazard
  - level of hazard

- Vulnerability
  - population density

- Risk
  - level of risk
Roles of Space Information

- Satellite Data for Risk Assessment
  - Hazard Mapping
  - Vulnerability and Risk Mapping
  - Satellite Data for Early Warning
  - Monitoring and Weather Prediction
  - Transmitting Data for Public Warning
- Satellite Data for Damage Assessment
  - Satellite Data for Recovery
Tsunami Early Warning System

1. Earthquake
   - Monitoring Device
   - Data Information and Integration
   - Analysis and Interpretation Hazards and Disaster
     - EQ > 7 SR
       - Yes: Warning
         - Issuance of Disaster to the Public (Including Transmitting/disseminating Information to Community)
       - No: Preparedness
         - Evacuation

- Various Agencies
  1. Seismograph (BMG)
  2. Accelerograph (BMG, PU)
  3. Tide Gauges (Ristek-Bako)
  4. GPS (Ristek - LIPI, Bako)
  5. Buoys (Ristek - BPPT)

- BMG
- Kominfo, Pemda
- BNPB
- BNPB, Pemda

- Scientific Research Support (Ristek)
  1. Expert System
  2. Decision Support System
  3. Hazards Mapping
Rapid Damage Assessment from Satellite Imagery

- THEMATIC DATA (and experience)
- LANDSAT DATA Before
- LANDSAT DATA After

Secondary Data from Other Reference

SEMI SUPERVISED

Classification & Superimposed

Result & Image
Tsunami, December 26th, 2004

Ulee Lhuee Harbour, City of Banda Aceh

Before Tsunami

After Tsunami
CONCLUSIONS

• BNPB needs partnership with ICG in developing Disaster Management Information System that supported by Global Navigation Satellite System

• Disaster Management in Indonesia needs support from Space Technology particularly in analyzing Hazard, Vulnerability, Risk, Early Warning, Identify Damage Assessment and Recovery

• BNPB will organize and procure Spatial Data for the purpose of Disaster Management, so Providers are welcome to participate in developing Indonesia’s DRR Program until 2015 by using Satellite –Base Technology

• Indonesia is a very big Country, so that BNPB certainly needs Space Technology for Decision Making
THANK YOU