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Indonesia Emergency Quick Response to the West Sumatra Earthquake*

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ABSTRACT

The earthquake creates damages and disaster to human being. The disaster cannot be avoided but the number of the victims can be reduced significantly depending on how the disaster is manage. The management of disaster then becomes importance especially the quick response, because time is very valuable every second saves lives.

The paper describes the implementation of the emergency quick response mapping that was implemented in Padang area that was hit by a powerful 7.6 Richter Scale earthquake, on September 30, 20009. The mapping was implemented in order to providing geospatial information very quickly to support disaster management efforts carried out by government and non-government organizations. The mapping consisted several activities starting from inventory, collection, processing, production, and distribution of geospatial data related to disaster such as casualties and damages.

1. INTRODUCTION

Indonesia suffered again from another powerful earthquake on Wednesday September 30, 2009. This time, Padang, and the surrounding, located in West Sumatera province was devastated by a 7.6 on the Richter Scale earthquake.

According to the Meteorological, Climatology and Geophysics Agency, this was an undersea earthquake that was centered 57 kilometers north-west of the city of Padang. The coordinate location of the epicenter was 0.84°S, 99.65°E and depth was 80 km set by location program.

Padang, a city of 900.000 inhabitants, sits on one of the world's most active fault lines along the "ring of fire", where the Indo-Australia plate and the Eurasia tectonic plate meets and creates strong earthquake.

This earthquake caused casualties and badly damages. The death toll from the earthquake was more than 800 people. Around 200 people were reported missing and more than 2000 people got injured. This is excluded more than 600 people who were buried by the earthquake-triggered landslides happened in four villages located in the mountainous areas surrounding the city of Padang.

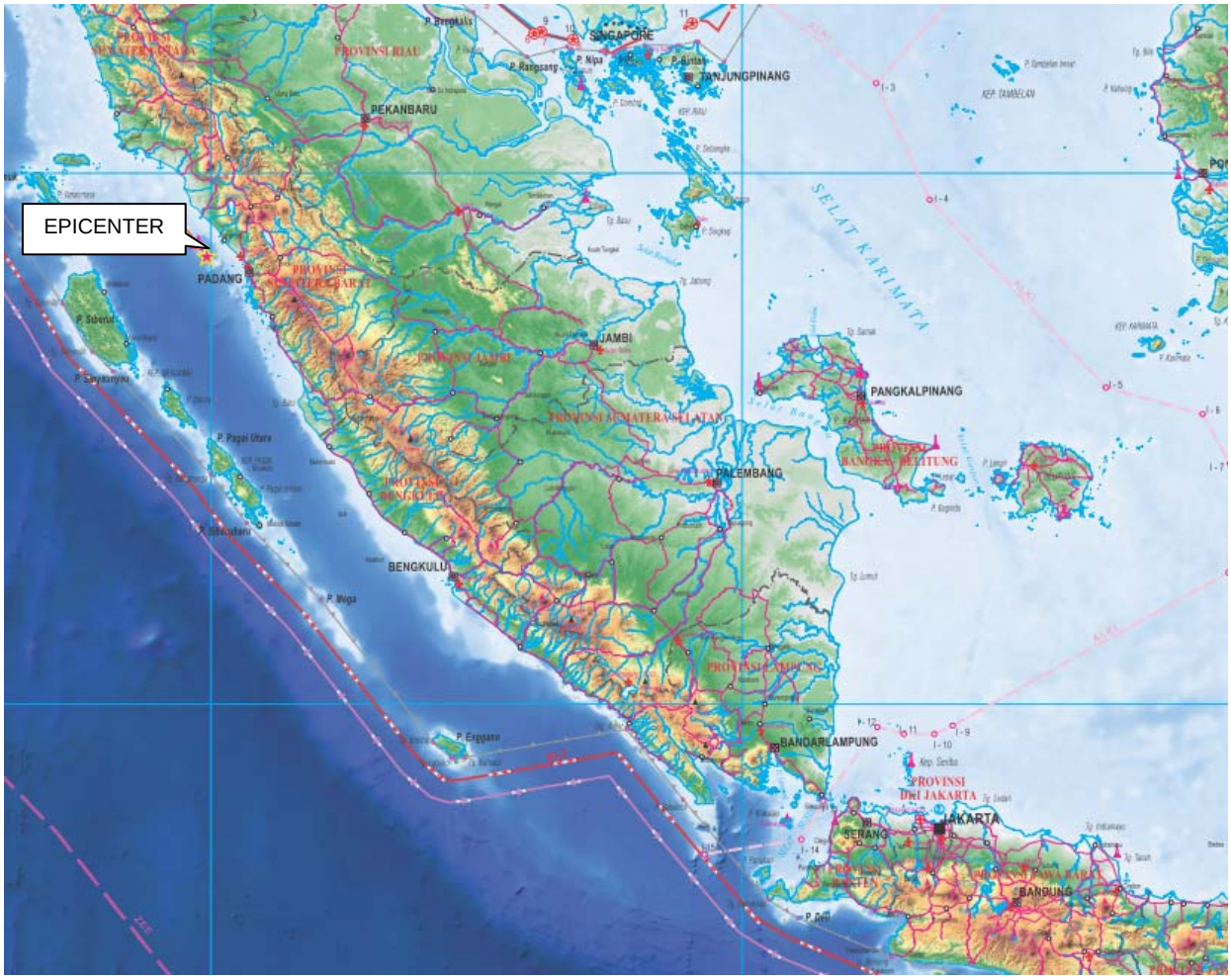

Figure 1. Padang Earthquake, 30 September 2009

More than 133,000 houses, shops, offices were destroyed while over 110,000 others suffered damages. Some large commercial buildings, hospitals, hotels, mosques and churches were even completely destroyed.

In addition to that, many infrastructures such as roads were fractured and bridges were brought down. This isolated people in remote areas, and broke supply lines of food, drinking water and medical to this people.

Around 90,000 families still live without shelters running out of food, drinking water, energy, and limited medical supply. The government built makeshift tents to temporally house these survivors.

Now some basic needs such as electricity, telephone lines have been recovered. However distribution of food, water, medication to the people is still a big problem. The government now received a lot of food but found it difficult to distribute because the government had little information of the earthquake victims whereabouts. The reconstructions of infrastructures to open access to people in isolated areas are also another work to do.

2. EMERGENCY QUICK RESPONSE MAPPING

The National Coordinating Agency for Surveys and Mapping (BAKOSURTANAL) of Indonesia took a quick response to this disaster. BAKOSURTANAL along with other government agencies and private sectors agreed to supply geospatial data and information to be utilized in Padang.

Actually there is a procedure for utilizing geospatial data for disaster management. There are three maps needed for this purpose namely: the Disaster Prone Areas Map, the Emergency Quick Response Map and the Rehabilitation and Reconstruction map. The Disaster Prone Areas Map will be used before the disaster happened because in the map there is regulation for making or not making human activities in the designated areas. The Emergency Quick Response Map is a map that is produced and used just after the disaster to help save the people trapped in the destroyed buildings and to distribute food, water, medical supplies. This map is produced on-site

by mapping all damaged objects in the field, location of food supply, drinking water and medical supply. The third map is a map that is used for rehabilitation and reconstruction of the disaster area.

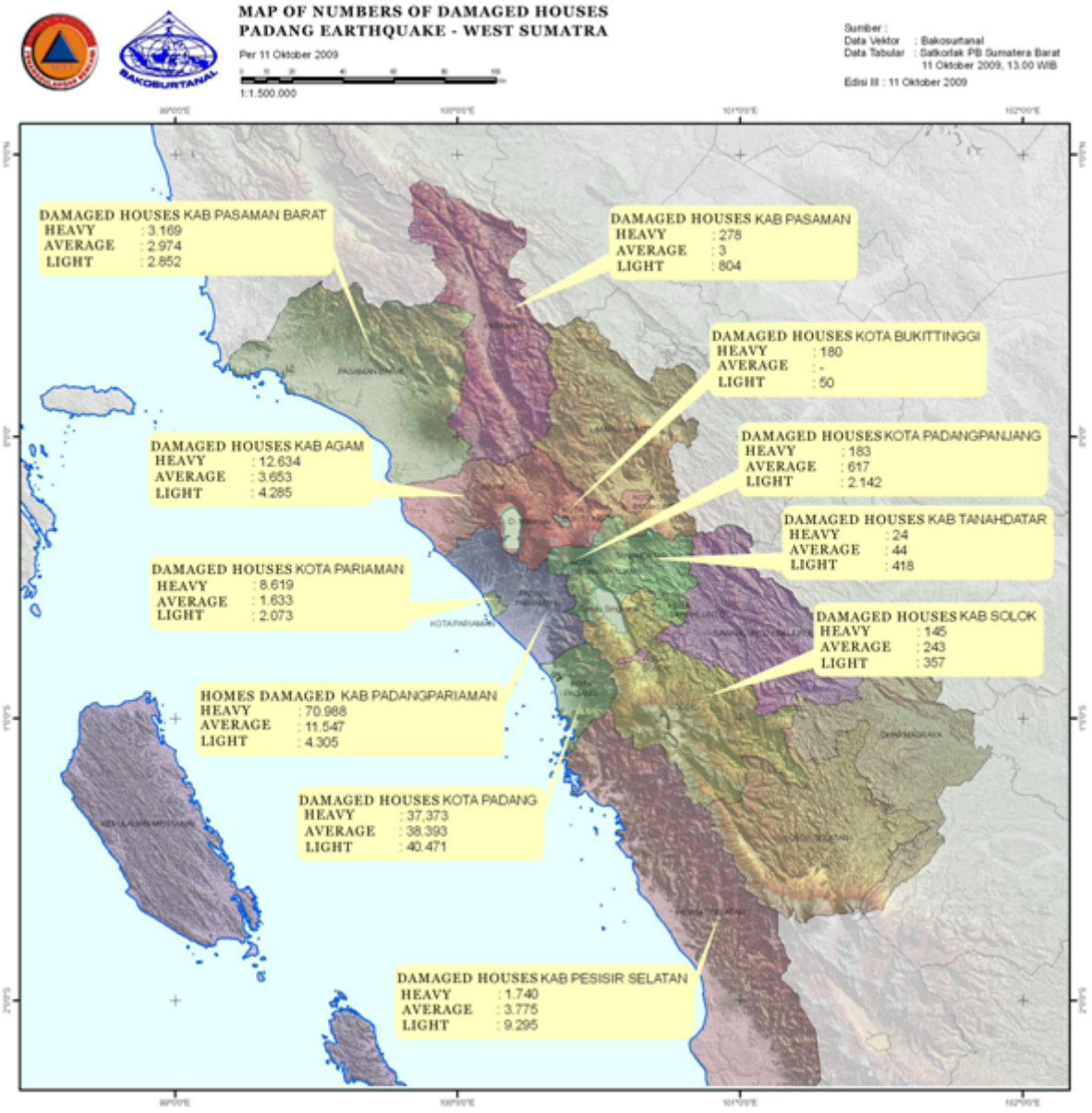

Figure 2. Emergency Quick Response Map

BAKOSURTANAL few days after the disaster established a mapping team and immediately sent the team to Padang. The team was designed to perform coordination with other local and international institutions and organization, to produce the emergency quick response map by

collecting casualties, damaged buildings and infrastructure data, processing the data and producing into maps and distributing the maps.

Organization

There were some organizations involved in the survey and mapping activities in Padang and the surrounding, they were:

- BAKOSURTANAL,
- National Agency for Mitigating of Disaster (BNPB),
- Regional development and Planning Board (BAPPEDA),
- Regional Public Works Office,
- WANADRI (Mountain and Jungle Explorer Association),
- WAINDO-RSGIS Forum,
- Department of Energy and Mineral Resources,
- National Space and Aeronautics Agency (LAPAN),
- Bureau of Central Statistics,
- World Bank and
- Non-government organizations such as MapAction and Archnova.

Field Surveys

Surveys of to get geographic location of damages buildings and infrastructures, buried vilages, food supply, and medical supply were carried out by WANADRI and BAKOSURTANAL.

The survey and mapping activities that was carried out in Padang area consisted of:

- Inventory of number of casualties and damaged areas in cities and villages,
- GPS surveys of damaged buildings and infrastructures,
- Coordination meeting
- Data processing and map production
- Data dissemination
- GPS survey of damaged buildings and its condition and infrastructures

Data Sources

To produce the emergency quick response map some data sources are needed. The data sources available at that time consisted of:

- Tabular data of damaged infrastructure (roads, bridges) from Regional Public Works Office.
- Topographic maps of 1:250.000, 1:50.000 1:10.000 scales, from BAKOSURTANAL
- Wall maps from BAKOSURTANAL
- Village admin boundary map and population distribution from BAPPEDA and BPS,
- Satellite imageries IKONOS of Padang from LAPAN

Data Products

After one week in Padang, the team is able to produce the emergency quick response maps for covering the need of the disaster management activities such as distribution of food, drinking water, and medical supplies, building temporary shelter, bring the wounds to the nearest hospital etc. The use of these maps is considerably increasing following the increase of the number of Humanitarian Aid organization. The emergency quick response maps are as follows:

1. Village boundary maps of Padang Pariaman and Agam districts.
2. Casualty and physical damaged map Padang Pariaman district
3. Casualty and physical damaged map of Pariaman city
4. Aggregate Casualty Map consisting themes:
    - number of casualty,
    - number of damaged houses,
    - number of destroyed health facilities,
    - number of broken schools,
    - number of damaged roads, bridges, and irrigation infrastructures

Data Users

The user of the emergency quick response maps consists of foreign and local non-governmental organization, international and local media, National Agency for Mitigating of Disaster, Police, Regional and local Government. Most of the foreign and local non-governmental organizations

are humanitarian aid organization so that they need maps for distributing the aids they received from the community.

3. LESSON LEARNED

During the first week after the earthquake, the city of Padang had no electricity that made communication in the area cut off. It was then not possible to see maps stored in computers or browse from internet. Printed map proved to be a much better solution to use the geospatial information.

The number of people understanding of geospatial in the disaster area should be considerably sufficient because map reading ability of the humanitarian aid organizations is low.

Disaster is not a new happening, but the response of the region to the disaster is not sufficient so that the socialization, exercise, training, of managing of disaster need to be implemented regularly and more frequent.

For mapping purposes, since maps is the first thing people needs to response the disaster, the emergency quick response mapping should be improved in particular the budget for the mapping should be made available promptly and at sufficient amount.

The regional government along the predicted disaster regions should provide disaster maps showing areas prone to disaster so that there will be no human activities in the areas.