Case Study: Disaster Risk Assessment in Nagekeo District, East Nusa Tenggara

Background

Nagekeo is one of the districts in Flores Island of East Nusa Tenggara Province, Indonesia. The area was one of the least developed area in the eastern part of Indonesia and the land is extremely dry and prone to drought that lead to food and water crisis. Moreover, several other types of disaster such as flood, land slide, volcano, forest fire, and intrusion of sea water have known to happen historically in the past.

Considering such circumstances, the local government decided to conduct a proper disaster risk assessment, but they need support especially in terms of capacity building to be able to produce such policy. To answer such needs, the Australia Indonesia Facility for Disaster Reduction (AIFDR) and Humanitarian OpenStreetMap Team Indonesia (HOT ID), through the Capacity Development Support Program (CDSP), assisted the Provincial Disaster Management Agency of Nagekeo District to conduct a disaster risk assessment.

This case study discusses the implementation of disaster risk assessment training and workshop, as part of lines of activities to formulate disaster risk assessment document in Nagekeo District. The training was aimed to provide the necessary knowledge and skills to conduct disaster risk assessment especially by using QGIS and InaSAFE. It involved 23 people as participants with the majority representing the local government and a few of them representing non-government organizations.

Implementation

Day 1: Overview on Disaster Risk Assessment in Nagekeo District

As an introduction, the training was started with an overview of disaster risk assessment in Nagekeo District. On the morning session, a number of presentations were delivered by experts covering topics such as the paradigm of disaster management, the concept of disaster risk assessment and disaster risk assessment activities.

The afternoon session, on the other hand, required active participations from the participants. The participants were divided into three focus group. Each group was assigned to discuss different topics hazard, vulnerability and capacity in the district, and have a group representative to present their findings to the plenary.

Day 2: Initial Formulation of Disaster Risk Assessment

The first session was a more in depth discussion about disaster risk assessment. It covers issues such as the general process of disaster risk assessment, the data needed to formulate disaster risk assessment and where such data could be collected. The session also emphasized the importance of cooperation and collaboration of government offices across different sectors to deliver disaster management efforts.

Figure 1. Discussion result from one of the small groups mapping the sources of information

The second activity that day was producing capacity – vulnerability map. The activity was started with a preparation of the data on Microsoft Excel.[1] The participants were divided into four groups with Group I and II processing capacity data, while Group III and IV processing vulnerability data. The participants also need to split up the data among themselves to enable them to process a large amount of data in shorter amount of time.

Once the process of preparing the data on Microsoft Excel was finished, the next activity was integrating the Excel data into the map using QGIS interface to produce capacity and vulnerability map. Several presentations were delivered about QGIS interface, demonstration of how to add vector data, as well as different kind of symbolism and labelling, and how to insert them into the map. After that the participants were assisted to create their own map.

Image 2. Introduction to QGIS and integrating capacity and vulnerability data into the map

[1] In this exercise, the participants used Villages Potency (PODES) data published by the Indonesian Bureau of Statistic (Badan Pusat Statistik / BPS).

Day 3: Field Survey

On the third day, the participants conducted field survey to collect other important data for the map. The participants were divided into four groups to conduct field survey in four different sub-district, with each sub-district consists of two villages (total eight villages).

Each group carried several equipment, which consist of 2 units of GPS and field survey forms. Separate survey forms were provided to help collecting different information such as public facilities, spots that are prone to disaster, infrastructures, agriculture assets, and other information from the community members and leaders. Each group distribute different tasks among themselves based on what data should be collected by who. The survey was finished in one day. The type of natural disasters that are concluded after the survey are flood, drought, earthquake, land slide and volcano.

Figure 3. *Field Survey and Interview*

Day 4: Data Input

The first activity on the fourth day was entering the field survey data. The interview results were compiled into a document, which later on would be used to provide explanation and support the analysis of each type of hazard. Meanwhile, the GPS data was entered into QGIS.

The second activity was producing hazard map. Several training materials, such as scoring, weighing, map overlay and attribute data manipulation using QGIS were delivered during this session. After that, the participants practiced to create their own map by working in five groups with each group represents particular type of disaster detected during the survey, which include flood, earth quake, land slide, drought and volcano.

Once the participants had finished producing hazard maps, they were assisted to produce disaster risk map, in which the participants put together the total score in the capacity and vulnerability map, which were produced on the second day, and the total score of the hazard map, which was produced on the fourth day. By the end of the day, the five groups produced five different disaster risk map for each type of hazard/disaster.

Day 5: Risk Valuation and Map Layout

On the fifth day, the participants learned and practiced analyzing and processing data. The morning session was about risk valuation, in which the participants were trained to calculate several variables to measure the level of risk. In this particular training, the variable that were used are building, public facility, population, housing, rice field, farm and unirrigated agricultural field. InaSAFE was used to calculate the value of buildings and population, while the rest of the variables were calculated by overlaying each variable with hazard data, and then formulated in Microsoft Excel using Pivot Table in order to produce exposure and impact data at each disaster hazard zone.

The second material that day was map layout, in which the participants were assisted to produce ready-to-print disaster risk map. The participants learned further about how to create a good map that is easy to understands by using symbols, correct naming of objects, standard legends, scale, direction, etc. The following pictures are some of the samples of map created by the participants.

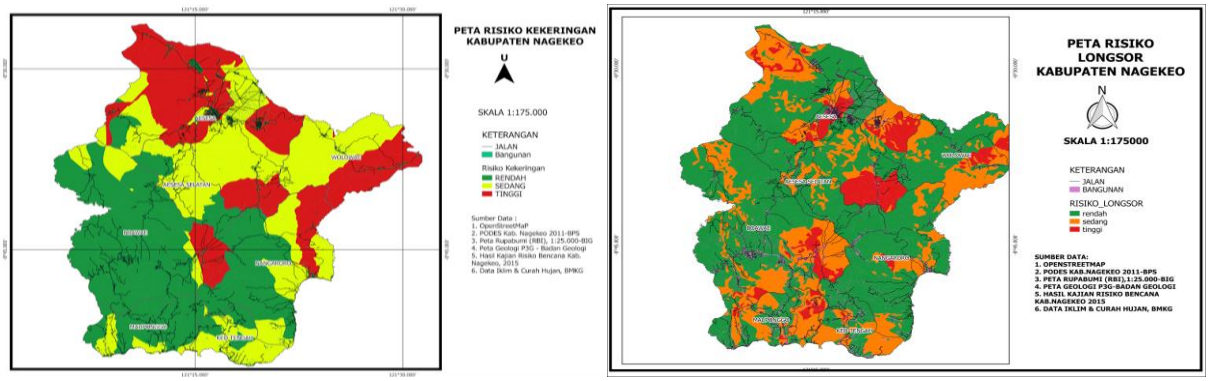

Figure 4. *Disaster Risk Map Produced by Training Participants*

The last activity was for the participants to formulate for themselves follow up ideas to bring the training learnings and results into their works once they get back to their respective offices. The training was concluded with presentation of the participants' idea to follow up the learnings and results that they have achieved during their training.

Figure 5. *Participants calculating Disaster Risk Valuation and conducting Policy Discussion*

Results

By the end of the training, the participants had managed to produce disaster risk map. This map recognized five types of natural disaster (i.e. flood, drought, earthquake, volcano and landslide), which could potentially bring risk across the area. Since the participants were mostly consisted of local government staffs from relevant sectors and offices, this is a significant step to improve the disaster management policy document and efforts in the area.

Lessons learned

The participants in general expressed enthusiasm, which shows the need for capacity building among local government officials in this area. Most of the feedback from participants were request for longer time and more trainers, which further emphasized demands on their side.

During field survey, it was worth noted that geographical location and spread out of each surveyed village could significantly influenced the duration of the survey. For instance, smaller village with centralized public facilities would take faster time to survey compared to larger village with spread out public facilities.