

NEED ASSESSMENT AS A PRELIMINARY STEP TO BUILD DISASTER INFORMATION SYSTEM IN YOGYAKARTA PROVINCE

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ABSTRACT

Indonesia has many vulnerable areas due to disasters, whether caused by nature or by human. Disaster caused by several factors such as geographical, geological, climatic and other factors, such as diversity of social, cultural and political. This condition has been responded by many people, including Indonesian Government by making some laws that include the disaster aspect.

In April 2007, BAKOSURTANAL, Gadjah Mada University and Government of Yogyakarta Province signed a MOU with the aim to improve the ability of the parties to optimize the development of science and technology in the field of environmental data and information and resources to support sustainable development with attention to factors disaster. The scope of this cooperation includes research and development of science and technology, education and training, implementation and utilization of technology, survey and mapping, and community empowerment.

As a follow-up of this MOU, BAKOSURTANAL, Gadjah Mada University and Government of Yogyakarta Province in accordance with the capacity of each conducted the Geo-risk Development of Coastal Management, which focuses on providing the information to support disaster mitigation effectively. The final output is a Disaster Management Information System (DMIS), where data will be systematically organized, capable and can applied to all aspects and phases of the disaster, and can support the sustainable development in Yogyakarta.

The first step is the study of the needs of the user, which its result furthermore will be used for feasibility analysis, system development and provision of data and application. Study of user needs, in principle, involve many elements and related parties, such as local governments, NGOs and central government.

The result of this study is information about user needs, including data and information required in order to minimize the disaster risk. Furthermore this information can be used as an important input to build disaster information system in Yogyakarta Province.

Keywords: Need assessment, Disaster, Yogyakarta

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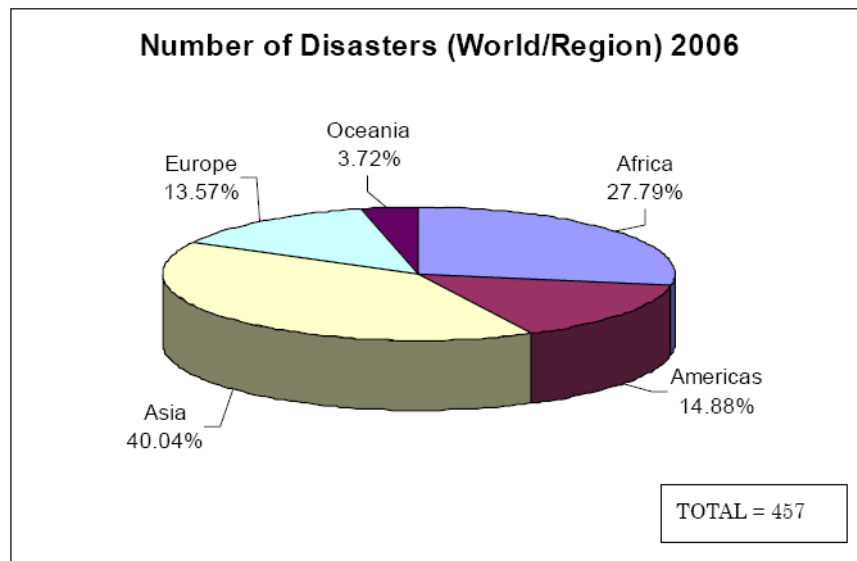
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1. Introduction

Asia accounted for most of the devastating disasters that occurred in 2006 (40%, increase from 37% in 2005), followed by Africa (28%; an increase from 19% in 2005), the Americas (15%; a decrease from 20% in 2005), Europe (14%; a decrease from 21% in 2005), and Oceania (4%; a marginal increase from 3% in 2005). Figure 1 summarizes the 2006 data visually. The majority of the disasters in 2006 were floods and wind storms followed by epidemics, extreme temperatures, earthquakes, and slides.



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006 in ADRC (2007)

Figure 1: Proportion of Worldwide Disasters by Region, 2006

Indonesia, as one of the country in Asia, has many vulnerable areas due to disasters. Geographically Indonesia is an archipelago situated at a juncture of four tectonic plates, the Asian Plate, the Australian Plate, the Indian Ocean Plate and the Pacific Ocean Plate. The southern and eastern part of the country features a volcanic arc stretching from Sumatra – Java - Nusa Tenggara - Sulawesi. The remainder features old volcanic mountains and lowlands partly dominated by marshes. They make for a high potential and proneness to disasters, including volcanic eruptions, earthquakes, tsunamis, floods and landslides. Data suggest that Indonesia has a high seismicity among countries of the world, with an occurrence rate more than ten times that of the United States (Arnold, 1986).

Disasters in Indonesia always increased every year. Based on National Action Plan for Disaster Reduction 2006-2009, within the period of 2003-2005, there were 1,429 disaster incidences with hydro-meteorological disasters comprising the bulk at 53.3 percent. Within those events, floods occur most often (34.1%), followed by landslides at 16%. Although geological disasters (earthquakes, tsunamis and volcanic eruptions) comprise only 6.4% of the total, they caused tremendous loss and fatalities. Most

fatalities were accounted for by the combined earthquake and tsunami disaster in the Province of Nanggroe Aceh Darussalam and North Sumatra on 26 December 2004 and the massive earthquake in Nias, North Sumatra on 28 March 2005 (Bappenas, 2006).

Law No.27 of 2007 about Management of Coastal Areas and Small islands, Chapter X Article 59, states that any person who live in the coastal regions and small islands are obliged to carry out disaster mitigation into any activities that can potentially cause damage to coastal regions and small islands. Law No.26 of 2007 about Spatial Planning, Article 6 Paragraph (1), explains that spatial planning should implemented with consideration of physical condition of Indonesia which is very vulnerable due to disaster. Whereas the Law No.24 Year 2007 about Disaster Relief, Article 4-9, states that disaster management required cooperation between the government and local government in order to cope with disaster in planned, integrated, coordinated, and comprehensive.

In April 2007, BAKOSURTANAL - and UGM Yogyakarta province signed the MOU aims to improve the ability of the parties to optimize the development of science and technology in the field of environmental data and information and resource area to support sustainable development with attention to factors disaster. The scopes of this cooperation include research and development of science and technology, education and training, implementation and utilization of technology, survey and mapping, and community empowerment.

As a follow-up of this MOU, BAKOSURTANAL, Gadjah Mada University and Government of Yogyakarta Province in accordance with the capacity of each conducted the Geo-risk Development of Coastal Management, which focuses on providing the information to support disaster mitigation effectively. This activity is planned to be implemented within several years (see Figure 2). The final output is a Disaster Management Information System (DMIS), where data will be systematically organized, capable and can applied to all aspects and phases of the disaster, and can support the sustainable development in Yogyakarta.

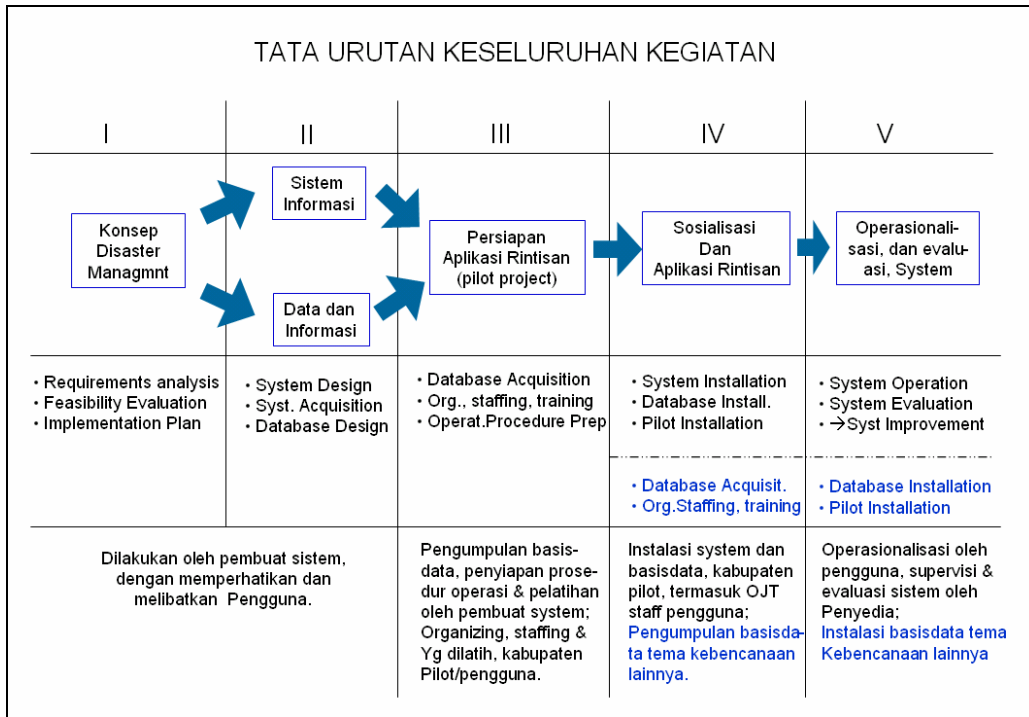


Figure 2: Overall Geo-risk Activities

In order to implement disasters mitigation effectively, we need a better and accurate information as an important input for government to make decisions in term of disaster. Therefore, we need a well structured Disaster Management Information System (DMIS) which is capable and can be applied to all aspects and phases of the disaster. This system must be customized to the needs of users for different levels. The information presented should be the data that can be trusted and can be used as inputs for decision-makers. It is necessary to make a clear design / concept of the system that will be developed which focuses on the needs of the users.

The first step of this system development is the study of the needs of the user, which its result furthermore will be used for feasibility analysis, system development and provision of data and application. Study of user needs, in principle, involve many elements and related parties, such as local governments, NGOs and central government.

Therefore, this paper is addressed to identify present status of data (spatial/non spatial data), human resource, infrastructure, financial budget/allocation for disaster, and the existing disaster information system in Yogyakarta Province.

The result of this study is information about user needs, including data and information required in order to minimize the disaster risk. Furthermore this information can be used as an important input to build disaster information system in Yogyakarta Province.

2. Objectives

Objective of this study is to identify the needs of the data needed for decision making in order to mitigate the disaster. Furthermore, the data and information obtained through this study will be used as a starting point in order to develop Disaster Management Information System (DMIS) in the next few years.

3. Limitations

The stakeholder analysis unevenly distributed.

- 12.5% of respondents are INGOs, without any information about the involvement of the NGOs.
- The research studies are not yet included.
- Equal information from the national and local/regional stakeholders is not yet elaborated.

The depth of the analysis is limited to:

- Type of data availability, without further explanation towards the characteristics of the data.
- The availability of the system information, without further explanation about the management/procedure of the system.
- The availability of the data has not yet verified in terms of the scale and source availability.

4. Methods

The pre-fieldwork started with an intensive literature review through journals, books, previous studies and reports relevant to get more information about the proposed data needs and methods that will be used during the fieldwork and data analysis stage. The key concept of this research is using user as a local knowledge to gain the information and hopefully, it can used as an valuable input in making a DMIS.

From the technical meetings, we formulated the questionnaires. The questionnaires were made into 2 (two) types; the first is for the decision-makers, and the second is for technical staff. Each of them was made into six sections to gain all the information needed. First section is general information including a personal profile of the respondent (Name, Institutions, Position, Address, etc). The second section is about the general information regarding to disaster mitigation/response/activities on their institution. Section three and four are regarding to data availability and the existing human resource and infrastructure, while section five is about the financial resource. The last section is about Disaster Information System.

5. Results and discussions

Results from questionnaires will be described based on each section as the following:

5.1 Respondent Identity

This section was used to describe respondents' identity. There were 32 institutions in Yogyakarta Province, which related to disaster response/activities, interviewed using questionnaire, both government institutions and NGOs (look at Table 1).

Table 1: List of Institutions Interviewed

No.	Institution	No.	Institution
1	P3BA Sleman	17	Kantor Pelayanan Data dan Elektronik Kab. Kulon Progo
2	Dinas Kesehatan Kab. Sleman	18	Kantor Kesatuan Bangsa dan Perlindungan Masyarakat
3	Dinas Kesehatan Kab. Kulon Progo	19	Kantor Informasi dan Komunikasi Gunung Kidul
4	Kantor Kesbanglinmas Kab. Kulon Progo	20	Kantor Kesatuan Bangsa dan Perlindungan Masyarakat Kab. Gunung Kidul
5	Bapeda Kota Yogyakarta	21	Bapeda Kab. Gunung Kidul
6	Dinas Pertanian Yogyakarta	22	Dinas Kesehatan Propinsi DIY
7	Dinas Perhutanan dan Perkebunan Yogyakarta	23	IOM Yogyakarta
8	Dinas Kelautan dan Perikanan	24	Dinas Kimpraswil DIY
9	Badan Informasi Daerah Kota Yogyakarta	25	UNDP
10	BPPTK - PLG, Badan Geologi Yogyakarta	26	OXFAM DIY
11	Sekretariat Daerah - Bag. Kesra Kab. Kulon Progo	27	Bapedalda DIY
12	Kantor Linmas dan Pemadam Kebakaran Yogyakarta	28	Balai SABO
13	Badan Informasi Daerah Province Yogyakarta	29	Dinas Pertanian dan Kehutanan Sleman
14	PMI DIY	30	BMG
15	Dinas Pertanian dan Kelautan Kab. Kulon Progo	31	GTZ
16	Dinas Sosial Yogyakarta	32	BAPEDA DIY

5.2 General

From the questionnaires, we gained the information that there are 24 institutions (75% of the respondents) which already has a particular division to manage disaster data inventory. Each institution mostly collects their disaster data separately and didn't coordinate with other institutions. Subsequently, most of them collaborate with others in order to analyze those data. There is 34% of respondents coordinated with other institutions in order to analyze the data; 34% of the respondents did not coordinate with any other institutions; whilst 12.5% of the respondents coordinate with more than 4 other institutions to analyze the data. However, the product of the coordination between those institutions does not exist. Yogyakarta Province already has the SOP (Standard of Operating System) to response to disaster according to 75% of the respondents and it means local government should socialize this SOP to the community in order to increase the community knowledge about disaster and help to improve the community building in this province.

5.3 Data Availability

Result shows that most of respondents (84.4%) state that their institutions are disaster data user. Meanwhile, 71% state that they deal with disaster data inventory, 62.5% have task in coordination & policy direction; whilst 59.4% also handle disaster data analysis. We can get the point that most institution already know that they should take action to minimize the risk with provide a good and accurate data to make hazard maps, vulnerability maps, or even risk maps in their area. Therefore, many of them carry out many program related to data collecting and analyzed those data and information to support the map. Next, they can use those maps as tools to support planning and policy in local level.

Each institution already involved in the disaster management planning activities, which are: Preparedness & mitigation plan (62.5%); Emergency response plan (53.1%); Contingency plan (40.6%); and Early warning system plan (34.1%). The EWS seemed to be the least prepared in many institutions, it means local government should take into account this condition and tries to learn and develop the EWS plan for Yogyakarta Province; since Yogyakarta is categorized as a vulnerable area to earthquake, volcano, and many other disasters.

Most of respondents (74%) state that they provide access to the community towards their available disaster data. Community can get the information about hazard, vulnerability or risk maps from the website or government office, such as Bappeda (Regional Development Planning Agency). Other results shows that 98% of the respondents claim that they already perform spatial approach in analyzing the data

related to disaster, and 100% of the respondents implement the participatory approach in socializing their analysis.

From the questionnaires for technical aspects, we get the information that the typified recorded data found in those institutions are location of the hazard (78.1%), quantification of loss/damage assessment (62.8%), and frequency of the hazards (62.5%). Based on their urgency, generally, they claimed that earthquake become their first priority, while typhoon become the second and flood in the third place (Table 2).

Table 2: Type of Hazard Based on Their Urgency

No.	Type of hazard	Score of Urgency
1.	Earthquake	11
2.	Typhoon	5
3.	Flood	5
4.	Tidal wave	4
5.	Volcanic eruption	4
6.	Tsunami	3
7.	Landslide	2
8.	Drought	1
9.	Pest	1
10.	Fire	1
11.	Mass movement	1
12.	Debris	1

Half of the respondents produced hazard map, *desa* (village) in figure, risk assessment and vulnerability map. They also provide hardcopy maps (75%), publications of disaster/reports (68.8%), point data samples from surveys (46.9%), remote sensing imagery (25%), and aerial photographs (18.8%). Remote sensing imageries available in their institutions are Landsat, Ikonos, and Quickbird. Unfortunately, most of data/information is still in different format and lack of metadata. There should be a guideline to develop hazard map, vulnerability, and risk maps in the same format.

Only 31.3% respondents are aware of the importance the RS/GIS. Most of them use

ArcView, ArcGIS and MapInfo software to analyze their data. More than 50% of respondents already applied the technique of cadastral survey and include the disaster management into their works; whilst more than 70% of respondents have familiar with the information system.

The most important information we get from the questionnaires is availability of disaster data in Yogyakarta Province. The result shows that disaster data found mostly in hardcopy. Earthquake and flood hazard map are the most produced among respondents. List of maps, which related to disaster in Yogyakarta, can be seen in Table 3 below.

Table 3: List of data related to disaster from questionnaires

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	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21	17.1	17.1	17.1
0	3	2.4	2.4	19.5
Basic Map	1	.8	.8	20.3
Drought	2	1.6	1.6	22.0
Drought Hazard Map	4	3.3	3.3	25.2
Earthquake	2	1.6	1.6	26.8
Earthquake Hazard Map	7	5.7	5.7	32.5
Flood	2	1.6	1.6	34.1
Flood Hazard Map	7	5.7	5.7	39.8
Flood Hazard Map; Landslide Hazard Map	1	.8	.8	40.7
Flood Map	1	.8	.8	41.5
Geologic Map	6	4.9	4.9	46.3
Geological Map	2	1.6	1.6	48.0
Geology	1	.8	.8	48.8
Geology Map	1	.8	.8	49.6
Land	1	.8	.8	50.4
Land use Map	5	4.1	4.1	54.5
Land Use Map	5	4.1	4.1	58.5
Landslide	2	1.6	1.6	60.2
Landslide Hazard Map	5	4.1	4.1	64.2
Landslide Map	1	.8	.8	65.0
Lanslide Hazard Map	1	.8	.8	65.9
Multi hazard	1	.8	.8	66.7
Multi hazards Map	1	.8	.8	67.5
Multihazard map	1	.8	.8	68.3
Multihazard Map	2	1.6	1.6	69.9
Multihazard map, flood and landslide hazard map	1	.8	.8	70.7
No Maps in Bappeda only	1	.8	.8	71.5
Rainfal Intensity Map	6	4.9	4.9	76.4
Rainfall Intensity	1	.8	.8	77.2
RBI Map	3	2.4	2.4	79.7
Soil	1	.8	.8	80.5
Soil Map	6	4.9	4.9	85.4
Topographic Map	14	11.4	11.4	96.7
Typhun	2	1.6	1.6	98.4
Typhun Hazard Map	2	1.6	1.6	100.0
Total	123	100.0	100.0	

5.4 Human Resource and Infrastructure

Based on interviews, halve of the respondents had the human resources to input compile and analyze data (56.3%) (Figure 3). Expert in each institution are varied, ranging from 2 – 4 persons.

D1a

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0	1	3.1	3.1	3.1
1	18	56.3	56.3	59.4
2	13	40.6	40.6	100.0
Total	32	100.0	100.0	

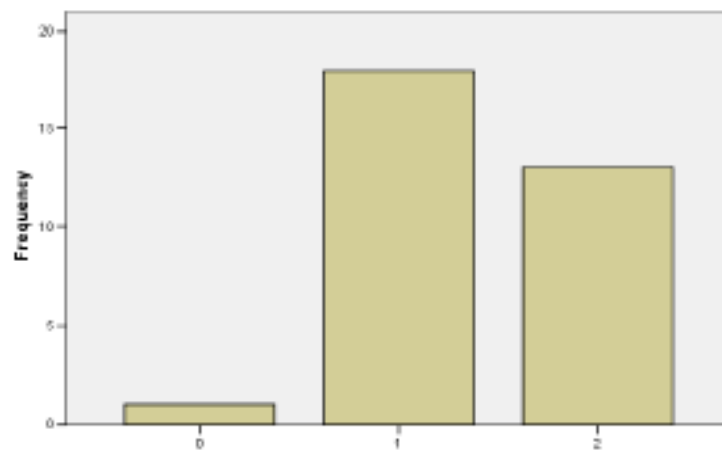


Figure 3: Distribution of respondents based on the availability of human resources to manage disaster data

However, it also found that most of respondents are lack of supporting hardware and software. This condition influenced by the financial budget in each institution.

Most of the government institution had limited human resource skill compare to non-governmental organization (NGO), either in quantification and qualification.

5.5 Financial

Local and regional level did not have much support from the national level in terms of the availability of information system facilities. Halve of the respondent claimed to have private budgeting in terms of providing the information system facilities.

5.6 Disaster Information System

Almost 75% of the respondent provides paperwork in the disaster mitigation sector, only 50% of the respondent has the system information of disaster. The most common information provided by the information system is varied, but rarely cover all the information. Almost all of the respondents eager to have access towards the new system information, which has the hazards, vulnerability and risk assessment for certain type of hazard.

6. Conclusions

There are some conclusions obtained from this study, which are:

- Various stakeholders involved in the decision making process and technique operational of the disaster management in Yogyakarta Province.
- The necessity of stakeholders are varied, most of stakeholders are involved in the phase of preparedness and mitigation process, and least are involved in the early warning system operation.
- SOP are available in most of stakeholders, however, the most difficult part are synchronizing the differences among SOP on each stakeholder.
- The data is not up to date, mostly in the form of hard copy without any information on real time data.
- There is no adequate data standardization in each of the stakeholder.
- Training towards human resources is urgently required, since each stakeholder only has 2-3 people's deals with the data input/analysis.
- Funding or budgetary system to support the activity in the development of system information, data collection and other activity in the disaster management merely on the local level, less contribution from the national level.
- The stakeholder mostly eager to use the system information; least are eager to analyze the data.

7. References

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