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RISK MANAGEMENT MATURITY IN THE EARLY WARNING SYSTEM FOR FLOOD DISASTER MANAGEMENT AT BBWS BENGAWAN SOLO

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Abstract

The government's basic flood disaster risk management strategy plan is a form of anticipation and a way to minimize the impact of the disaster. Risk management focuses on reducing the impact of floods, shortening the time floods occur and can improve the quality of human resources in tackling flood disasters. The Maturity Model identifies the steps, types and sequences of activities that need to be meaningful and measurable. The aim is to provide a framework for increasing preparedness in mitigating floods from organizations by conducting an assessment of the strengths and weaknesses of flood disaster officers in the Bengawan Solo River Regional Office, measuring the maturity level of flood disaster management from experience that has been carried out out. The Bengawan Solo River Basin Center has the mandate to manage facilities and infrastructure in mitigating floods as well as early warning before a flood occurs. This study aims to obtain the dominant risk factors for floods and the maturity level of the Disaster Management Unit in managing risk. The results of this assessment will provide recommendations to increase the maturity of the Disaster Management Unit in implementing early warning systems and mitigating flood disasters. Research using AHP analysis obtains a high risk category in the risk of controlling the results of natural phenomena, planning and financial influences, while the assessor obtains the Enterprise Risk Maturity criteria for maturity level 4 (good) which means that the Disaster Management Unit has an ongoing commitment to management implementation, the principles have been implemented and accompanied by regular risk improvements in terms of control. The results of this study found a correlation between the assessment of flood risk management and the maturity of the disaster officers in the Flood Early Warning System at the Bengawan Solo River Basin.

Keywords: Risk Management Maturity, Risk Identification, Risk Mitigation and BBWS Bengawan Solo Flood Disaster Officer Unit.

INTRODUCTION

Maturity means fully developed or perfected, in common usage, Cooke-Davis [1]. This concept is increasingly being used to chart logical ways to improve an organization's services. It is used in "Best Practice" benchmarks, which denotes increasing levels of sophistication and other features. Maturity refers to the degree to which an organization consistently executes processes that are documented, managed, measured, controlled and continuously improved, Product Team Capability Maturity Model Integrity[2]. The planning process for flood risk management is driven by law and policies at the national, regional, local and site-specific levels. The integrated flood risk management methodology proposes the development

Statistik Bencana Menurut Jenisnya

Indonesia, 2023

Bencana	Jumlah	Korban					Kerusakan								
		Meninggal	Hilang	Terluka	Menderita	Mengungsi	Rumah	Pendidikan	Kesehatan	Peribadatan	Fasum	Perkantoran	Jembatan	Pabrik	Kios
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
101. Banjir	**159**	**6**	**1**	**0**	**25,177**	**537**	**720**	**1**	**2**	**2**	**16**	**2**	**8**	**0**	**0**
102. Tanah Longsor	228	52	8	5	284	2,289	130	1	0	1	12	0	5	0	0
103. Banjir dan Tanah longsor	5	0	0	0	0	181	44	1	0	1	0	0	1	0	0
104. Abrasi	2	0	0	0	496	0	103	0	0	0	0	0	0	0	0
105. Puting Beliung	174	0	0	2	504	52	1,180	6	2	6	19	7	1	0	6
106. Kekeringan	11	0	0	0	5,017	0	0	0	0	0	0	0	0	0	0
107. Kebakaran Hutan dan Lahan	48	0	0	0	0	0	1	0	0	0	0	0	0	0	0
108. Gempa Bumi	16	4	0	1	3	738	14	1	3	0	5	2	0	1	0
Jumlah	643	62	9	8	31,481	3,797	2,192	10	7	10	52	11	15	1	6

Bidang Pengelolaan Data dan Sistem Informasi (PDSI),
Pusat Data Informasi dan Komunikasi Kebencanaan (Pusdatinkom),
Badan Nasional Penanggulangan Bencana (BNPB)

of a systems-focused approach to manage the maturity of the framework and make effective and efficient decisions during the integration and implementation processes. Strategy is defined as a combination of long-term goals, specific targets, technical measures, policy instruments, and processes that are continuously aligned with the societal context, Gouldby B. et.al [3]. Threats caused by water in Indonesia have been recognized as the highest contributor to disaster events in this archipelagic nation of more than 17,000 islands and more than 230 million people. PDSI data (2023) shows that flood-related disasters account for number 1 of victims suffering the most from the total disaster events (Table 1). The Bengawan Solo Watershed is the widest watershed in the Bengawan Solo Watershed with an area of ± 16,000 km2 divided into the Upstream Bengawan Solo Watershed, the Madiun Kali Sub-watershed and the Bengawan Solo Downstream Sub-watershed. The Bengawan Solo River passes through 17 districts and 3 cities in Central Java and in East Java. The Bengawan Solo River has been a major concern both in the management of its water resources and in disaster management since the colonial era ,sda.pu.go.id, 2022) [4]. . The entire implementation of disaster mitigation is carried out by the government. The government is fully responsible for solving disaster problems, especially in terms of disaster mitigation. The roles and responsibilities of the government have been regulated in Law no. 24 of 2007, that the implementation of disaster management responsibility is handed over to the central government, regional governments, and BNPB (National Disaster Management Agency), but in articles 28, 29 and 30 of Law no. 24 of 2007 formulates business institutions and international organizations in disaster management both individually and collectively. The role of the central government is spread across various Ministries and non-ministerial institutions, each of which has its own function and role in terms of disaster mitigation. The function and role of local government is very clear in disaster mitigation, local governments develop disaster management plans including mitigation, pre-disaster and post-disaster activities. Activities carried out by the regional government coordinate with all related agencies that have a function in disaster mitigation. The regional government also coordinates the preparation of disaster management plans with PUPR, because PUPR institutions have more authority over disaster mitigation. Basically the regional government and PUPR have the same position in handling disaster mitigation. PUPR has duties and functions that are directly within the authority to handle disaster mitigation. The regional government also coordinates the preparation of disaster management plans with PUPR, because PUPR institutions have more authority over disaster mitigation. Basically the regional government and PUPR have the same position in handling disaster mitigation. PUPR has duties and functions that are directly within the authority to handle disaster mitigation. The regional government also coordinates the preparation of disaster management plans with PUPR, because PUPR institutions have more authority over disaster mitigation. Basically the regional government and PUPR have the same position in handling disaster mitigation. PUPR has duties and functions that are directly within the authority to handle disaster mitigation.

RESEARCH METHODS

The research methodology will discuss the research process research strategy, variable identification, research instruments used for the type of data collected, data collection techniques, data processing techniques. According to Sugiyono, the definition of research method is a scientific way to obtain data with the aim of being able to describe, prove, develop and discover knowledge, theory, to understand, solve, and anticipate problems in human life (Sugiyono: 2012).

RESULTS AND DISCUSSION

1. Explanation

The discussion in this chapter is about data analysis starting from the data collection stage. Data collection in this study consisted of 2 stages of data collection. The first stage is to collect data from experts in the form of questionnaires that will be verified, classification and validation of the research variables. The initial research variables were taken from various references to be used as variables and then the experts would give an assessment of these variables.

2. Data collection

Table 1. Risk Variables for Flood Management

Variables	Risk Events
	Phenomena of Nature / Natural
R1	There is a trend of increasing maximum rainfall and intensity in the Bengawan Solo BBWS Environment
R2	Increased discharge of surface runoff due to land use changes in the retention area in the Bengawan Solo BBWS Environment
R3	Changing the function of lakes/swamps into residential areas/other activities in the Bengawan Solo BBWS Environment
R4	Areas and areas of basins and bowls that are prone to inundation in the Bengawan Solo BBWS Environment
R5	River channel geometry (bottom slope and meandering, "bottle neck", sedimentation, and natural embankments in the BBWS Bengawan Solo Environment
R6	The trend of sea level rise due to global climate change can cause flooding in the Bengawan Solo BBWS Environment
R7	Tides of Sea / River Water in the Bengawan Solo BBWS Environment
	Risk When Planning
R8	Technical, financing and environmental feasibility studies are not and or lack of concern in the implementation of the construction of river normalization infrastructure and facilities in the Bengawan Solo BBWS Environment
R9	The update of the Flood Disaster Preparedness planning document has not yet referred to other previous studies in the Bengawan Solo BBWS Environment
R10	Update Planning document prepared with limited supporting data (secondary) and primary data (hydrology and topography).
R11	Flood Mitigation Plan has been prepared in coordination and synergy with other related institutions (stakeholders)
R12	Choice of design and technology as well as specifications of River Normalization Infrastructure and Facilities
	Technical Risk
R13	Transfer of Land Functions in the Retention area is one of the causes of flooding
R14	The occurrence of a broken/critical embankment
R15	Failure of water structures/flood control
R16	The failure of the early warning system in the water level reader building

R17	Insufficient and/or inadequate building capacity for flood control channels/reservoirs
R18	Operations and Maintenance (O&M) of Flood Pumps, Watergates, dams that have not been implemented optimally
R19	Transportation of Garbage/Sediment/Debris at Watergates/Waste Filters that are not carried out routinely causes a weir effect
R20	Implementation of channel construction that is not carried out in accordance with the water management system (planning document) and flood shell

	Environmental Risk
R21	Domestic waste carried upstream in settlements along rivers/rivers/canals into rivers/streams/canals/reservoirs for flood control
R22	Reduction in river capacity due to accumulation of waste/debris in river bodies or in sluice buildings
R23	Development of diarrheal diseases due to poor sanitation during floods and inundation
R24	Development of skin disease
R25	Development of diseases associated with upper respiratory tract infections (ARI)
R26	Increasing Population Density and Urbanization
R27	Dense settlements on the banks of rivers/situ/reservoirs Flood Control
R28	Changes in land use due to the development of commercial areas, offices, housing and industry
R29	Cultivation and spatial planning of upstream river basins that pay little attention to soil conservation principles

	Economic Risk
R30	Cessation or disruption of residents' activities in settlements and the work of community members
R31	Damage to infrastructure/utilities (roads, drainage, electricity, telkom and PAM) other urban social facilities
R32	Damage and loss to houses/offices/factory buildings and their equipment, motorized vehicles, shops/markets and others
R33	Increase in the price of basic commodities
R34	Traffic jams, depending on flights and train travel
R35	Increased claims against insurance
	Financial/Financing Risk
R36	The need for organization and personnel for the emergency response team and investment in the procurement of flood emergency response equipment
R37	The need for funding for reforestation and arrangement of watershed areas
R38	The need for repair costs for damaged houses and city infrastructure due to flooding.

R39	
R40	Cost of losses to be used in the process of calculating rehabilitation and reconstruction needs. Repair Costs Manual/automatic river level monitoring post
	Risk of Construction Projects affected by floods
R41	When a flood hits, it can disrupt the implementation of city infrastructure construction
R42	Disturbances in the implementation of private project construction
R43	Cancellation or rescheduling of infrastructure construction or private projects
R44	Performance of infrastructure and means of automatic river flow measuring devices built for flood early warning
	Security and Safety Risks
R45	When a flood occurs, the target for providing assistance is not on target
R46	Insecurity and no guarantee of protection while security facilities cannot be created quickly
R47	Loss of people's livelihoods
R48	Lost Human Souls

Source: Self Processed, 2023

3. Data analysis

In research data analysis is an activity after all data is collected, and grouped based on variables and types of respondents. Data analysis techniques in research using statistics. There are two kinds of statistics that are usually used to analyze data, namely descriptive statistics and inferential statistics.

Variables	*mode*		Risk Categories
	Influence Levels	Frequency	
R1	5	4	*high*
R2	5	4	*high*
R3	2	1	*Low*
R4	3	3	*Significant*
R5	5	4	*high*
R6	3	2	*Significant*
R7	2	2	*Medium*
R8	2	1	*Medium*
R9	3	2	*Significant*
R10	3	4	*Significant*
R11	5	5	*high*
R12	5	5	*high*
R13	5	5	*high*
R14	3	4	*Significant*
R15	2	1	*Low*
R16	1	2	*Low*

R17	2	1	*Low*
R18	2	2	*Low*
R19	1	2	*Low*
R20	2	1	*Low*
R21	4	3	*Significant*
R22	3	4	*Significant*
R23	2	2	*Medium*
R24	1	2	*Low*
R25	1	1	*Low*
R26	3	3	*Significant*
R27	4	3	*Significant*
R28	4	3	*Significant*
R29	1	1	*Low*
R30	2	1	*Low*
R31	3	3	*Significant*
R32	2	3	*Medium*
R33	3	3	*Significant*
R34	2	3	*Medium*
R35	3	1	*Medium*
R36	5	5	*high*
R37	5	5	*high*
R38	5	5	*high*
R39	4	4	*Significant*
R40	4	4	*Significant*
R41	4	3	*Significant*
R42	3	3	*Medium*
R43	4	4	*Significant*
R44	5	4	*high*
R45	2	2	*Medium*
R46	3	3	*Medium*
R47	2	3	*Medium*
R48	1	1	*Low*

CONCLUSION

Based on the results of the analysis that has been carried out, several conclusions can be drawn, as follows:

1. Literature Review shows variables for risk and Enterprise Risk Management (ERM):
   a. Flood Disaster Mitigation Risk as many as 48 variables
   b. Enterprise Risk Management (ERM) with 81 criteria
2. Dominant risk factor (risk potential/major risk) based on the results of data processing using the AHP (Analytical Hierarchy Process) method in the Flood Disaster Officer Unit at BBWS Bengawan Solo, which affects the level of risk based on the risk category, variables with the High risk category are obtained. as follows:

a. Organizational needs and emergency response team personnel and investment in the procurement of flood emergency response equipment. (R36)
b. There is a trend of increasing maximum rainfall and intensity in the Bengawan Solo BBWS Environment. (R1)
c. Increased discharge of surface runoff due to changes in land use retention areas in the Bengawan Solo BBWS Environment (R2)
d. Financing needs for reforestation and arrangement of watershed areas (R37)
e. Choice of design and technology as well as specifications of River Normalization Infrastructure and Facilities (R12)

3. Based on the ERM analysis, the level of Risk Management Maturity Model of the Flood Disaster Officer Unit at BBWS Bengawan Solo with a Mean value of 3.48 is level 4, namely Good, this means that the Flood Task Force has a monitoring system for the implementation of risk management, the principles have been implemented and accompanied by periodic improvements.
4. There is a correlation between dominant risk factors and maturity indicators at level 4, namely the problem of flood disaster control/mitigation, where the dominant risk factors result from a lack of control over risks in Finance and Natural Phenomena.

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