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Analysis of disaster events in Serang City seen from the number of victims and damage

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ABSTRACT

Disasters are natural events that we do not know precisely when they will occur. In Serang City, some disasters that usually occur are related to the seasons in Indonesia, namely the rainy and dry seasons. These disasters include floods, droughts, collapsed houses, landslides, lightning strikes, and fires. This study aims to determine the types of disasters that occur in the city of Serang. In addition, to find out the casualties and damage affected by the disaster. This research was conducted using a qualitative method with descriptive research type based on data issued by BPBD Serang City. The type and source of data used is secondary data. The results of this study showed that there have been 1,083 disaster events in the last three years in Serang. The disasters were floods, collapsed houses, lightning-struck houses, fires, landslides, and droughts. The total number of injured victims was 18, and the number of affected victims was 40,140, while the total damage caused by the disaster was 591 damages.

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1. INTRODUCTION

Indonesia is one of the countries prone to natural disasters (Kodar et al., 2020). Disasters can threaten and disrupt people's lives (Gustaman et al., 2020). The frequent disasters that occur in Indonesia are influenced by the factor that Indonesia is located between the subduction zone or the meeting of three colliding tectonic plates, namely the Indo-Australian plate, Eurasian plate, and Pacific plate (Rahmat & Alawiyah, 2020). In addition, Indonesia is located on the equator, which causes Indonesia to have a tropical climate with two seasons, namely summer and rainy (Priambodo et al., 2020). The number of active volcanoes and Indonesia's diverse reliefs also add to Indonesia's disaster-prone factors (Pratikno et al., 2020). Conditions like this make Indonesia subscribe to disasters yearly (Rahmat et al., 2020).

Serang City, the capital of Banten Province, is one of the cities where disasters often occur. The most common disasters are landslides, floods, droughts, and extreme weather. Natural disasters cannot be predicted precisely when and where they will occur (Pangestu & Fedryansyah, 2023). Disasters threaten and disrupt people's lives, which can be caused by natural and non-natural factors, namely humans (Nursyabani et al., 2020). Meanwhile, according to (Nurillah et al., 2022), *disaster* is defined as a natural

and non-natural indication that makes people uneasy with the impact it causes, ranging from loss of comfort to disruption of security and peace of community life.

Natural disasters caused by natural factors include floods, landslides, volcanic eruptions, tsunamis, tidal floods, and celestial bodies (Falaq et al., 2021). Non-natural (human) factors are nuclear bombs, environmental pollution such as air pollution, river water pollution, factory waste disposal, and others (Rahmah & Ikhsan, 2022). Although some disasters such as the eruption of Mount Merapi can have a positive impact on the fertility of the surrounding soil, but still these natural disasters bring various negative impacts that result in many losses (Hamid et al., 2021). Natural disasters can provide physical damage such as destruction of infrastructure, disruption of communication networks, and can even cost lives (Utomo & Marta, 2022).

Serang City itself is not immune to disasters, both natural and non-natural disasters. These disasters cause some damage, such as flooded houses, collapsed houses, or landslides. In addition to material damage, natural disasters in Serang also cause injuries. This research can be a reference or evaluation for the future regarding disasters that can occur in Indonesia, especially in Serang City. In accordance with the results of this study, disasters and damage caused can be known so that in the future it can be prevented so that it does not happen again.

Disaster management needs to be done to minimize the damage. The objectives of disaster management include Preparing for all disasters or unwanted events, Emphasizing losses and casualties that can arise due to the impact of disasters and events, increasing awareness of all parties about disasters, and Protecting community members from the dangers or impacts of disasters so that the victims and suffering experienced can be reduced (Danil, 2021). Disaster management that can be carried out includes preparation before a disaster occurs, during a disaster, and after a disaster (Nakoe, Moh Rivai, n.d.).

The research approach uses the Participatory Rural Appraisal (PRA) method to obtain primary data through interviews and Focus Group Discussions in the journal Vulnerability and Capacity of Coastal Communities in Serang City in Disaster Risk Reduction Efforts. Handling the risk of flooding is carried out early. In the journal Flood Disaster Hazard Study Using Methods Topographic Wetness Index The research method used was study references, structured interviews and discussions with the parties regarding empowerment efforts young menyoung women in overcoming floods in overcoming floods. Gaps in this research journal The method used in this research is different from the journal that has been explained but has the same aim in overcoming disaster problems.

2. RESEARCH METHOD

This research uses variables observation/participant observation, surveys interviews, focus groups, experiments, secondary data analysis. The data is collected from various sources such as books, news, and the government center at BPBD. The location of this research is in the Serang City area. This research uses descriptive qualitative methods. Descriptive qualitative research describes data as it is and explains data or events with qualitative explanatory sentences. The data source used in this research is secondary data, such as research results from BPBD Kota Serang, BNPB, journals, and related scientific articles (Isnaini, 2019). This research aims to discover the types of disasters that occurred in Serang City and the amount of damage and victims affected by the disaster. The research was conducted between January and December 2023.

3. RESULTS AND DISCUSSIONS

Serang City is an expansion of Serang Regency which was formed on August 10, 2007 based on Law Number 32 of 2007 concerning the Establishment of Serang City in Banten

Province. Serang City has the following boundaries: (a) North borders Banten Bay which is located in Banten Village and Sawah Luhur Village; (b) East bordered by Pontang Sub-district in Sawah Luhur Village, Ciruas Sub-district and Kragilan Sub-district of Serang Regency; (c) South bordered by Cikeusal Sub-district, Petir Sub-district, Baros Sub-district of Serang Regency; (d) West bordered by Pabuaran Sub-district, Waringin Kurung Sub-district, Kramat Watu Sub-district of Serang Regency.

The results of this research and previous research have different results because in the results of subsequent research there are renewable solutions and more detailed.

Table 1. Area by Subdistrict in Serang City in 2023

Subdistrict	Number of Subdistrict	Area (km²)
Curug	10	38,96
Walantaka	14	36,56
Cipocok Jaya	8	34,10
Serang	12	26,55
Taktakan	13	61,16
Kasemen	10	68,85
Total	67	266,18

Source : BPBD Kota Serang, 2023

Administratively, Serang City is divided into six sub-districts and 67 villages. These sub-districts are the Curug sub-district, Walantaka sub-district, Cipocok Jaya sub-district, Serang sub-district, Taktakan sub-district, and Kasemen sub-district. Of the six sub-districts, the area of Serang City based on data processed in 2023 is 266.18 km2. Based on the 2010-2030 Serang City Spatial Plan, disaster-prone areas in Serang City are identified as Natural disaster-prone areas, categorized as Protected Areas in the context of the Serang City Spatial Pattern. Natural disaster-prone areas, as intended, include 3 (three) categories of disaster-prone areas, namely: (a) Flood-prone areas spread across Cipocok Jaya, Banjarsari, Ciracas, Sumur Pecung, Kaujon, Kota Baru, Cipare, Lopang, Kaligandu, Trondol, Sukawana, Priyayi, and several points in Kasemen Sub-district; (b) Areas prone to earthquakes, ground movements, landslides, and flash floods located in parts of Taktakan and Cipocok Jaya; (c) Tsunami-prone areas are located along the north coast of Serang City, directly facing the Java Sea and Sunda Strait.

The Disaster Incident Report in Serang City in 2021 has 92 cases, with the highest number of collapsed houses, landslides 5 cases, fires 4 cases, fallen trees 31 cases, floods 32 cases, and one drought disaster.

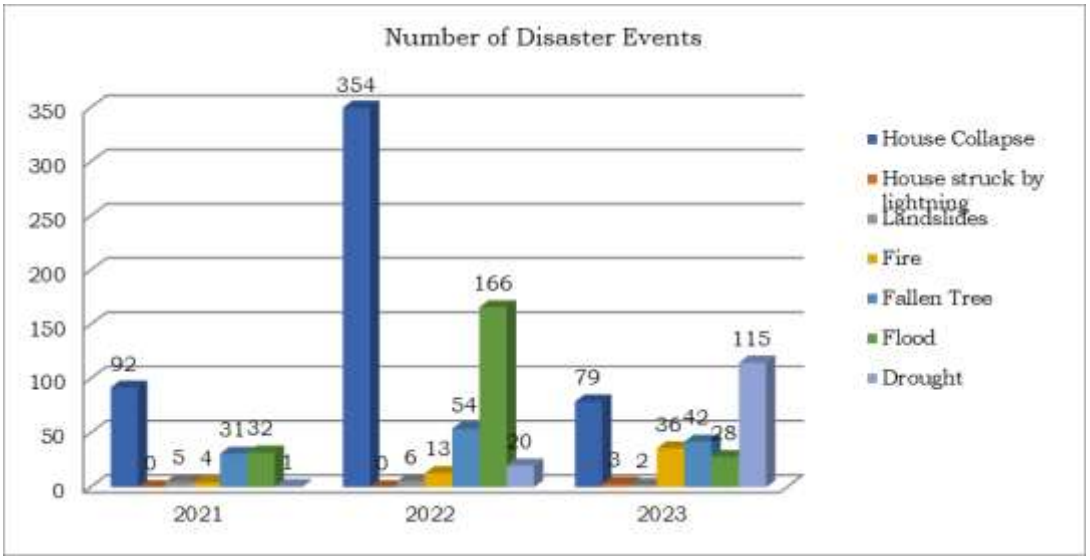

Figure 1. Number of Disaster Events in Serang City Region in 2021 – 2023

Source : BPBD Kota Serang, 2023

In 2022, disasters that occurred in Serang City, there was an increase of 354 cases of collapsed houses, 6 cases of landslides, 13 cases of fire, 54 cases of fallen trees, 166 cases of flooding, and 20 cases of drought. Whereas in 2023, the cases of collapsed houses fell to 79 cases, 3 cases of houses hidden by lightning, 2 cases of landslides, fire cases increased to 36 cases, 42 cases of fallen trees, 28 cases of flooding, and 115 cases of drought.

Flood cases jumped in 2022 to 166 cases, which increased many times due to a lot of housing and lack of water catchment areas. Meanwhile, in 2023, there were 115 cases of severe drought due to the natural conditions of El Niño due to global warming.

So, if you total the number of disaster incidents per year, namely, in 2021, there were 165 incidents. In 2022, there were 613 incidents, and in 2023, there were 305 natural disasters in Serang. This data is based on data released by BPBD Serang City. Some types of disasters are also influenced by the seasons in Indonesia, where drought and fire disasters will increase during the dry season and vice versa. In the rainy season, disasters such as floods, landslides, falling trees, and collapsed houses will increase in intensity.

Table 2. Data on the Number of Victims and Damage Caused by Natural Disasters in Serang City

Types of disasters	Human									Damage											
	Die			Injured			Affected			Minor Damaged			Moderate Damaged			Heavily Damaged			Submerged		
	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023
Collapsed houses				9	6		394	421	335	35	121	18	26	123	54	30	119	71			
House struck by lightning						1			9			2			1						
Landslide												1									
Fire						1	10	40	47					7	9		6	19			
Fallen trees						1	11			2		2	6		2			1			
Floods							3127	2540	491										939	7631	342
Dryness									9851												

Source : BPBD Kota Serang, 2023

In the data on the number of victims and damage due to natural disasters in Serang City, we know that casualties in the case of collapsed houses in 2021, there were nine people injured and 394 affected; in 2022, there were six injured and 421 affected, while in 2023 there were no injured but 335 affected. Cases of minor damage due to collapsed houses In 2021, there were 35 minor damages; in 2022, there were 121 minor damages; and in 2023, there were 18 cases of minor damage. Moderate damage to houses in 2021, there were 26 cases; in 2022, there were 123 cases; and 54 cases in 2023. There were 30 cases of heavy damage in 2021, 119 cases in 2022, and 7 cases in 2023.

The incident of a house being struck by lightning in 2021 resulted in 1 person being injured. For 2023, this disaster resulted in 9 casualties, while for damage, there were two lightly damaged houses and one medium-damaged house. The landslide disaster in 2023 resulted in 1 house being slightly damaged. One person was injured in 2023 by the fire incident, and 97 people were affected over the last three years. Damage caused by a fire in 2022 was moderate damage to 7 houses and heavy damage to 6. In 2023, fires caused moderate damage to 9 houses and severe damage to 19.

Falling tree cases resulted in 1 victim and minor damage to 4 houses in the last three years. Floods caused the highest number of victims, 29,022 people, while 8,912 houses were submerged due to flooding in the last three years. The causes of flooding in Serang City are related to damaged environmental conditions and bad human habits, high rainfall, poor drainage systems, construction of houses on riverbanks, broken dams, and tree felling. The greenhouse effect is also a significant source of flooding and natural disasters in Serang City.

3.1 Disaster Management

Natural disasters are phenomena that are not known precisely when they will occur. The losses incurred can also be in the form of material and non-material losses. Disaster risk reduction efforts consider several aspects, such as sustainability and participation from all existing elements of society (Pahleviannur, 2019). Disaster Risk Reduction is a futures activity or activity as an effort to support sustainable development which can be done with good innovation and adequate knowledge (Septikasari et al., 2022).

Although we do not know when it will happen, with the sophistication of technology at this time, we can predict it based on the initial symptoms caused. Disaster management that can be carried out includes preparation before, when, and after a disaster (Nakoe, Moh Rivai, n.d.).

3.2 Pre-Disaster Stage

The cycle during the pre-disaster stage includes prevention, mitigation, and preparedness. Mitigation is an act of prevention and control (Darmawan et al., 2019). The main objective of disaster mitigation is to reduce the risks caused by disasters, be it casualties, economic losses, or damage to natural resources (Nuraeni et al., 2020). In addition, in the pre-disaster stage, socialization, counseling, and training on disasters are also carried out to create a disaster-resilient community.

3.3 Stage during a disaster

Activities during a disaster are also called emergency response. Emergency response is a series of activities carried out immediately after a disaster to deal with the adverse effects that arise (Tictona et al., 2020). Tictona further explained that emergency response includes rescue and evacuation of victims and property, fulfillment of basic needs, protection, refugee management, rescue, and restoration of infrastructure and facilities. In this emergency, the head of BNPB / BPBD has the authority to order his agency to mobilize resources, equipment, and logistics (Nakoe, Moh Rivai, n.d.). This is expected to reduce casualties and damage caused by the disaster.

3.4 Post-disaster stage

The post-disaster recovery stage is the stage of disaster assessment and rehabilitation activities (Dewi Fitriani et al., 2021). In some ways, post-disaster management can be seen as an opportunity to reorganize development planning systems that make people vulnerable to disasters (Fernandez & Ahmed, 2019), (Surtiari, 2019). In the post-disaster stage, the activities carried out are rehabilitation and reconstruction. Rehabilitation activities include environmental improvement of disaster areas, assisting, social psychological recovery, health services, and socio-economic cultural recovery. As

for reconstruction activities, namely the restoration of physical conditions through rebuilding with better design and use of equipment. Everything is done so that the same disaster does not happen again (IDK Kerta Widana, 2019).

4. CONCLUSION

Natural disasters cause many losses, both in terms of material and non-material. The amount of loss caused by natural disasters varies in each region depending on the intensity and frequency of disaster events as well as the vulnerability and capacity of the community. The total number of disasters in Serang City in the last three years reached 1,083 events. Some types of disasters are influenced by the seasons in Indonesia, where drought and fire disasters will increase during the dry season and vice versa. In the rainy season, disasters such as floods, landslides, falling trees, and collapsed houses will increase in intensity.

Judging from the results of this research, disaster events can be minimized so that the number of victims and damage affected can be reduced. The results of this research are used as input for the Serang City government, especially the related agency, namely the Serang City BPBD, in carrying out its duties and responsibilities for disaster management so that it is maximized. Various efforts are needed to anticipate possible disasters to reduce risk, prevent risk, or even eliminate disaster risk. Strategies are needed to increase community resilience to the increasing number of disaster threats. Both structural and non-structural mitigation activities and disaster preparedness are needed to reduce community vulnerability and to protect the community whenever a disaster occurs.

In addition, it is necessary to overcome several things to reduce the recurrence of disasters and reduce the amount of damage both in terms of casualties and damage. Such as spatial planning of flood areas, rehabilitation of hydrological area functions in watersheds, and using rainwater utilization systems combined with infiltration wells, which can be used to preserve groundwater and collect and absorb rainwater. It is also hoped that the government, through BPBD, can aeducate the public about disaster emergency response, especially people in disaster-prone areas. This research does not yet have a way to achieve maximum results, a way so that all the solutions that have been obtained in this research can be implemented.

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