Available online at: https://journal.pencerah.org/index.php/jspi

Journal of Social and Policy Issues

E-ISSN: 2807-3843 I P-ISSN: 2829-8632

Implementation of Mitigation Overcoming Annual Flood Disasters in Demak Regency

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ARTICLE INFORMATION

Received: August 04, 2025
Revised: September 16, 2025
Available online: December 31, 2025

KEYWORDS

Implementation; Mitigation; Flood Disaster,

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A B S T R A C T

Most areas near the sea are highly vulnerable to flooding, both flash floods and flooding during heavy rains. When a natural disaster occurs, the most important thing to consider is disaster management and control. Post-flood disaster management is crucial to mitigate the impact and damage caused to victims, as well as the illnesses they suffer. Rapid preparation is crucial to reduce risk, damage, and impact. Government policy is a crucial component in assisting flood victims. A qualitative descriptive research approach was used in this study. To improve the accuracy of the research objectives and provide a clear picture of the phenomena or social realities studied, a qualitative descriptive study was chosen. A qualitative approach was used to collect descriptive data that can provide a detailed picture of disaster mitigation, such as prevention, mitigation, emergency response, and recovery. Direct interviews were used to obtain information related to disaster mitigation in overcoming the impact of flooding in Karanganyar Regency and Demak Regency with several informants, such as the Demak Regency Regional Disaster Management Agency (BPBD), the Karanganyar Regency Government, and the Village Government. Significant prevention through environmental and physical regulation and control. River normalization, such as river deepening and dredging, and river widening to restore strength. Meanwhile, work on the breached embankment is still incomplete. The Karanganyar Regency Government is working to prevent flooding by normalizing the river, such as deepening and dredging, and widening it to restore its strength.

INTRODUCTION

Indonesia is prone to natural disasters such as earthquakes, landslides, forest fires, and floods. Furthermore, changing natural conditions also contribute to disasters, one of which is flooding. This is particularly evident during the rainy season, when disasters such as flooding are highly likely. Among these disasters, flooding is the most frequent. Given Indonesia's maritime status, with oceans stretching far beyond its landmass, this contributes to the high number of natural disasters. (Hadi, B.S. 2024).

Post-flood disaster management is crucial for addressing the impact and damage caused to victims, as well as the illnesses they suffer. Rapid preparation is crucial for mitigating risks, damage, and impacts. (Aco. F. DR. Minhar, 2021). Government policy is a crucial component in helping flood victims.

In 2023, flooding was the second most frequent disaster in Indonesia, with a total of over 1,170 cases, and Central Java province was among the top five regions affected by flooding. The floods damaged infrastructure, disrupted community activities, and caused property losses, resulting in an estimated economic loss of over 16 billion rupiah. (Iman, 2023).

Demak Regency, Central Java Province, is one of the regions in Indonesia frequently hit by flooding, including tidal flooding caused by rising sea levels and flooding caused by heavy rainfall. Flooding in Demak Regency is caused by several factors, including heavy rainfall, flat topography, river sedimentation, and dam failures. Flooding in Demak Regency has various negative impacts, including infrastructure damage, economic losses, and loss of livelihoods. (Amin. M. 2024).

According to a report from the Regional Disaster Management Agency (BPBD) Operations Control Center (Pusdalops) of Demak Regency dated Monday, March 18, 2024, water levels between 50 and 200 cm were observed in five different locations. The National Disaster Management Agency (BNPB) reported that 24,946 people have been displaced out of a total of 97,147 affected. The government has currently established 45 evacuation posts in Demak Regency. (Hardiyanto, S. 2024). The Regional Disaster Management Agency (BPBD) has urged residents to be aware of the possibility of flooding occurring again and the presence of wild animals such as snakes in flood-prone areas.

The following are areas in Pati Regency that were affected by flooding of more than 50 percent, as can be seen in the following table:

No	Region	Flood Information
1	Demak	75 persen
2	Sayung	65 persen
3	Guntur	65 persen
4	Kebonangung	60 persen
5	Mranggen	55 persen
6	Karanganyar	90 persen

From the table data above, it is clear that the Karanganyar area is an area with a very wide flood impact, so it requires attention and local government policies in carrying out real mitigation in the stages of implementing concrete policies in the future.

Government regulations and laws play an important role in reducing the frequency of flood disasters. Disaster Management Law Number 24 of 2007 and its implementing regulations. In disaster management, the Demak Regency Government is tasked with upholding basic rights and protecting the community. (Central Java Provincial Gazette of 2009 Number 11, Supplement to the Central Java Provincial Gazette Number 26) Central Java

https://doi.org/10.58835/jspi.v5i4.527

Provincial Regulation Number 11 of 2009 concerning the Implementation of Disaster Management in Central Java Province. When a policy or law is established by the government, the policy is implemented according to field conditions. (PERGUB).

Disaster mitigation is a series of actions aimed at minimizing disaster risks, which can include building physical infrastructure or increasing awareness and capacity to recognize disaster threats. (Wati, Astina, 2018). Disaster mitigation can be carried out before, during, and after a disaster occurs. To facilitate understanding of disaster management activities, one way is to refer to a cycle. The disaster risk management cycle, the Mitigation Circle in Stephen Bieri's paradigm, is as follows: Prevention, refers to actions taken to implement, eradicate, or significantly reduce risks through environmental and physical regulation and control. (Istinah. I. Dicky. 2025). By reducing pressure and distributing energy or resources over a wider area or over a longer period of time, this approach seeks to suppress the source of the threat.

Based on this understanding, the Pati Regency government has capitalized on implementing emergency preparedness policies, which involve estimating future disaster needs and determining the resources needed to meet those needs. This helps communities in vulnerable areas better prepare for emergencies.

Understanding that losses due to disasters are inevitable, emergency response efforts implement various measures efficiently. Emergency preparedness includes developing and implementing emergency response plans, managing, preparing, and testing early warning systems, stockpiling essential supplies, conducting drills and simulations, and establishing alarm mechanisms and standard operating procedures.

Meanwhile, emergency response activities that need to be considered include the initial and final post-disaster activities. Actions taken at this stage include identifying the source of the disaster, a brief impact analysis, and the availability of resources to immediately determine needs. This can include search and rescue, first aid, evacuation, housing and accommodation for evacuees, emergency medical care and supply delivery, resource mobilization, and the restoration of essential facilities, including water, transportation, communications, and other public services. (Habib. Y. P. dkk, 2024).

Furthermore, recovery is an effort aimed at helping communities recover what has been lost, rebuild their lives, and restore opportunities. This can be achieved by rebuilding and reusing existing facilities, restoring and enhancing their capacity to cope with future disasters, and rebuilding.

Based on this, the problem can be formulated, namely how to implement policies taken by the regional government in preventing flood disasters in Pati Regency and post-flood mitigation plans so as to minimize the potential for losses that occur in the future.

METHOD

This study uses a qualitative descriptive research method. To increase the accuracy of the research objectives and provide a clear picture of the social phenomena or realities being studied, a qualitative descriptive study was chosen. (Sugiyono, 2013). A qualitative approach is used to collect detailed research data based on accurate field findings.

A good measurement instrument is necessary because, in theory, conducting research means taking measurements. The measurement instrument used in research is called a research instrument. According to Sugiyono (2013), research instruments are tools used to measure observable social and natural phenomena.

This study utilized several relevant data sources from various informants, including the Head of the Demak Regency Regional Disaster Management Agency (BPBD), sub-district heads, village heads, and flood-affected communities. Informants were selected using a purposive sampling method. Menurut Sugiyono (2013), *Purposive sampling is a sampling technique based on certain considerations or criteria that have been previously formulated by the researcher.*

While each data collection technique has its advantages and disadvantages, researchers use various methods to obtain accurate, more relevant, and accountable data. Several data collection methods were used in this study, including observation, interviews, and documentation.

The data analysis performed included data reduction. Data reduction is a type of analysis that simplifies, categorizes, focuses, and eliminates irrelevant information, as well as organizes information so that conclusions can be drawn and confirmed. Researchers do not always interpret data reduction as quantification. Several approaches exist for simplifying and transforming qualitative data, including rigorous data selection, brief summaries or descriptions, grouping data into more general patterns, and so on. Continuous data reduction occurs throughout the research and is focused on qualitative research.

RESULTS AND DISCUSSION

Demak Regency has an area of 1,149.07 km², consisting of 897.43 km² of land and 252.34 km² of sea. Demak Regency has a coastline of 34.1 km that stretches across 13 villages, namely Sriwulan, Bedono, Timbulsloko and Surodadi, then Tambakbulusan Village, Karangtengah District, Morodemak Village, Purworejo and Betahwalang Village, then Wedung Village, Berahankulon, Berahanwetan, Wedung and Babalan. Then on the coast of Demak Regency, various mangrove vegetation grows around 476 hectares. (PERDA, 2016).

Demak Regency has significant groundwater potential, with 166.2 million m³ of shallow groundwater per year and 4.1 million m³ of deep groundwater per year. However, on average, both shallow and deep groundwater in Demak do not meet the requirements for drinking water. Karanganyar is a sub-district in Demak Regency, Central Java, Indonesia.

Main Problems Causing Flooding

To find out the factors causing flooding in February and March, the author conducted direct interviews with several informants, namely the Demak Regency BPBD represented by Mr. Anam as disaster management staff, the Karanganyar Regency Government represented by Mr. Jefri as local government public service staff, the Karanganyar Village Government represented by Mr. Lathif as village secretary, the Head of Cangkring Rembang Village, Mrs. Asrofah, and the flood-affected community with explanations that have similarities, including:

"The factors causing flooding are various conditions and activities that contribute to its occurrence. These factors can be grouped into two main categories: natural factors and human-caused factors.".

In addition to human factors acting in disharmony with the environment, there are also other factors, namely, natural factors also contribute to flooding, because natural conditions

https://doi.org/10.58835/jspi.v5i4.527

independent of human activity play a role, such as high rainfall, physiography, soil erosion and sedimentation, river capacity, drainage capacity, and the influence of sea tides. To find out the natural factors causing flooding in Karanganyar Regency, the author conducted direct interviews with several informants.

River Sedimentation

Soil erosion and sedimentation in rivers can reduce their capacity, making them prone to overflowing during prolonged, heavy rainfall. Researchers asked whether soil erosion and sedimentation occurred in rivers in Karanganyar Regency before the floods occurred, as this could contribute to the flooding that occurred during heavy rainfall in Demak Regency.

The informant's answer was that soil erosion and sedimentation in the rivers prior to the flood were very high, causing the water to overflow. Some embankments were unable to withstand the water flow, causing them to break, reducing the water flow. This was due to severe sedimentation at the water outlet. This then led to the high sedimentation in the Wulan River and other rivers.

Mitigation Implementation

Disaster mitigation encompasses prevention, mitigation, emergency response, and recovery. The author conducted direct interviews to obtain information related to disaster mitigation in dealing with the impact of flooding in Karanganyar Regency, Demak Regency, with several informants, including the Demak Regency Regional Disaster Management Agency (BPBD), the Karanganyar Regency Government, and the Village Government.

Significant preventative measures are being implemented through environmental and physical management and control. River normalization efforts, such as deepening, dredging, and widening, are underway to restore its strength. Work on the breached embankment is currently underway, and the work is not yet complete. The Karanganyar Regency Government is preventing flooding by normalizing the river, such as deepening, dredging, and widening the river to restore its strength. Repair work on the breached embankment, which caused the flooding, is also underway.

Emergency Response

Emergency response is carried out by the government to address future needs in the event of an emergency disaster and identify resources to meet these needs, so that communities in disaster-prone areas in Demak Regency can better respond to disaster preparedness. Researchers received an explanation of emergency preparedness from the Regional Disaster Management Agency (BPBD) for handling flood disasters in Demak Regency, including the Karanganyar area.

"Emergency response preparedness carried out by the Demak Regency BPBD includes continuous socialization and monitoring of vulnerable embankments to ensure the potential for embankment collapse, and so on, so that monitoring and evaluation of potentials that could be dangerous in the future can be carried out".

Recovery Plan

The recovery stage carried out by the government through the Demak Regency BPBD is by cleaning up the remaining mud, cleaning up the garbage and is not only carried out by the BPBD but also assisted by related OPDs, volunteers numbering approximately 500 people, both from Central Java and other regions, because when talking about humanity there are no administrative boundaries. Meanwhile, for the recovery carried out by Karanganyar Regency, namely from the infrastructure and public service sectors, the recovery was carried out in stages, because the sub-district office was submerged, but during the flood, the sub-district government continued to open public services in tents erected at gas stations and set up emergency tents for the community.

"A recovery plan was also implemented in Cangkring Village, Rembang, with the community working together to clean up flood debris after the waters began to recede. The affected community, unwilling to be overly affected, immediately began repairing the damage, and the local village government also assisted in repairing infrastructure and public services that had been disrupted".

Following the flood disaster, the Jitupasna forum was convened to assess post-disaster needs, involving the Regional Development Planning Agency, the Public Works and Spatial Planning Agency, and the Housing Agency. Next, relevant agencies and other parties conducted an assessment, particularly regarding post-disaster losses. The total losses were reported to the National Disaster Management Agency (BNPB). From there, a review of the disaster losses was conducted. The Jitupasna forum formulated these findings and then reported them to the local government for follow-up in the field.

Impact of Flooding

The flooding in Demak Regency has had widespread negative impacts on humans and the environment, including property losses, loss of life, health problems, economic disruption, social disruption, and environmental damage. This study conducted direct interviews to obtain information regarding the impacts experienced or caused by flooding in Karanganyar Regency and Demak Regency, with the Regional Disaster Management Agency (BPBD) of Demak Regency, the Karanganyar Regency Government, Village Governments, and several community members.

Information provided by the informants above indicates that the flooding in Demak Regency caused significant property losses, including residential buildings, in six affected sub-districts. While the Karanganyar region itself does not yet have specific data on property losses due to the flooding, estimates suggest that the cost per household or family card ranges from IDR 100 million to IDR 300 million in just one area, excluding the other five.

CONCLUSION

The annual flooding problem still experienced by residents of Demak Regency demonstrates the need for continuous evaluation and improvement of existing policies in flood-prone areas. Meanwhile, flood mitigation policy improvements should focus on three key aspects that the Demak Regional Government must address:

1. Improve river flow by building new embankments or renovating old embankments.
2. Normalize rivers that are prone to recurring annual flooding by dredging sediment in the river flow.

3. The importance of regular outreach to residents in flood-prone areas and residents who live around rivers.

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