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Collaboration For Management Of Rob Flood Disaster In The Coastal Area Of Semarang City

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Abstract: *This research aims to examine collaboration in handling tidal flood disasters in the coastal areas of Semarang City, especially in Tanjungmas Urban Village, North Semarang District. The research method uses a qualitative approach by collecting data through observation, interviews and documentation. The selection of informants used the purposive method. Meanwhile, for data analysis using the interactive model Miles & Hubbermen (2014). The research results show that handling tidal floods in Semarang City involves the collaboration of five parties (pentahelix), namely Regional Officials, Community Groups, Business and Industry, Universities, and Mass Media. Each party has a specific role in efforts to handle and overcome the impact of tidal floods.Regional apparatus plays the role of regulator and policy implementer. Community Groups actively participate in empowerment and disaster risk reduction. The business world contributes through the Corporate Social Responsibility (CSR) program for activities during handling and efforts to overcome them. Universities are involved through thematic Real Work Lectures and community service activities carried out by lecturers and students. Meanwhile, mass media plays a role in disseminating information to increase public awareness regarding handling tidal floods. The collaboration process is already underway but is not yet optimal, therefore several activities are needed, namely strengthening coordination between parties through regular forums and more effective communication mechanisms; increasing community capacity in disaster management through ongoing training and assistance.*

Keywords: *Collaboration, Disaster, Rob Flood, pentahelix,community.*

1. INTRODUCTION

The results of the study published in the April 2022 edition of Geophysical Research Letters, Semarang and Jakarta are included in the list of the fastest sinking cities in the world, Jakarta is in third place after Tianjin, while China and Semarang are in the list of the fastest sinking cities. Based on the study, the land in Semarang is in second place with an average subsidence of 3.96 cm per year. (Wijayanto, 2024). Semarang City as the capital city of Central Java Province, has faced flooding and tidal problems for years.Every year, the city of Semarang is inundated by sea water due to tidal flooding. This is due to the misuse of land on the coast of Semarang. The coastal area is naturally useful for accommodating sea water during low tide, but is instead used as a swamp, pond and even settlement. This results in sea water not being able to be accommodated and inundating areas that are lower in position. For exampleCoastal reclamation in the Marina Beach area of Semarang is considered as one of the causes of tidal flooding. This reclamation activity causes land subsidence, which results in the reclaimed land often being inundated by tidal flooding (Sembiring, 2019).

Development in coastal areas, such as the construction of malls, apartments, and hotels, as well as excessive exploitation of groundwater, has caused land subsidence in the northern area of Semarang City. This exacerbates the problem of inundation known as rob. Rob is a flood caused by the ebb and flow of sea water, this occurs when the land surface is below sea

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level during high tide. This is a persistent problem in the area and requires human intervention to overcome its impacts. (Indahsari, 2023).

The Semarang City Regional Disaster Management Agency (BPBD) recorded an increase in tidal flooding in the Semarang City area. In 2021, the Semarang City BPBD recorded 2 tidal flooding incidents in the City of Semarang. In 2022, tidal flooding incidents increased to 7 incidents, one of which was the largest tidal flooding incident that occurred on May 23, 2022. This incident was caused by the collapse of the sea wall in the industrial area of Tanjung Emas Port, North Semarang, which caused tidal flooding in the Bandarharjo and Tanjung Mas Villages. This flood is thought to have occurred due to a damaged embankment, causing water to submerge industrial and residential areas. The water level in residents' houses reached 50 centimeters, while on the road it reached 1 meter. Thousands of workers from various factories in the industrial area were forced to save themselves. In addition to vehicles such as motorbikes and cars, thousands of sewing machines and production machines were also affected. The extreme tidal flood that hit the Tanjung Emas Port of Semarang caused major losses with a loss value of IDR 615 billion (detik.com, 2022). Meanwhile, in 2023, the Semarang City BPBD does not yet have complete data regarding the number of tidal floods in Semarang City. However, tidal floods occurred on Thursday, June 1, 2023, at around 15.00 WIB in Tanjungmas Village, North Semarang District. The impact of the tidal flood was felt in RW 14 with a water level of around 10-20 cm, and in RW 15 with a water level of around 5-10 cm (bpbd.jatengprov.go.id, 2023).

In addition to submerging industrial and residential areas, tidal floods also submerged the Demak-Semarang Pantura road, causing road damage and traffic jams. Congestion occurred in both directions, both to Semarang and to Demak. From the direction of Semarang, this congestion reached 5.5 km from the Terboyo Terminal in Semarang, while from the direction of Demak it occurred up to the Onggorawe area along 3 kilometers.

The sub-district areas in North Semarang District, Semarang City that most often experience tidal flooding are Bandarharjo Sub-district, Tanjung Mas Sub-district, Dadapsari Sub-district and Panggung Lor Sub-district. Although mitigation efforts have been made, such as raising roads and using water pumps, the recurring tidal conditions indicate that the existing handling is not optimal, causing significant disruption to the lives and activities of the local community. In fact, Tanjung Mas Sub-district has increased in the last five years and the community has no way to overcome it by increasing the height of the house floor (Edy Lisdiyono et al., 2021).

Rob flood is a problem for residents and transportation users in Semarang City. People are uncomfortable when driving in the area, this is because the roads are damaged and flooded. As a result, vehicles will be damaged and porous due to flooding. Some people even choose to move from the areas affected by the rob, while other social impacts are disruptions to economic activities, education, waste, infrastructure and the environment. This condition also has an impact on reducing the interest of tourists to visit the city of Semarang because they have to pass through the rob flood.

According to Hakam (2018), efforts to deal with flooding and tidal flooding in Semarang have actually begun since the Dutch colonial era. During the Dutch era, the East Flood Canal (BKT) and West Flood Canal (BKB) were built, as well as embankments to prevent tidal flooding. However, it seems that this development has not been able to reduce the problem of flooding and tidal flooding. This is because efforts to prevent the recurrence of tidal flooding have only been carried out on the construction of tidal control. It is time for North Semarang and the port area to be reorganized by implementing inclusive and resilient principles, to prevent adverse impacts such as land subsidence and flooding. Policies that prohibit new development and reduce further damage, such as land subsidence, flooding, and groundwater extraction, must be enforced strictly with severe sanctions. Factories and industrial areas on the coast of Semarang also contribute to the exploitation of groundwater through drilling for industrial purposes, considering that most industrial areas are in the coastal area of North Semarang (Saputri and Linda, 2023).

As a form of responsibility, the Semarang City Government has attempted to handle the problem of tidal flooding by including tidal flood and flood control in Article 33 letter c of Semarang City Regional Regulation Number 5 of 2021, which is a revision of Regional Regulation Number 14 of 2011 concerning the Semarang City Spatial Planning Plan for 2011-2031, showing the active role of the Semarang City Government in efforts to prevent and overcome flooding and tidal flooding. However, if only the Semarang City Government is active in handling the disaster, it will not bring maximum results. The handling of tidal flooding must be carried out by all parties involved in overcoming the problem. Therefore, cooperation and collaboration from various parties are needed to overcome it.

The focus of this study is the Collaboration in Handling Rob Floods in Coastal Areas. While the locus is in Tanjungmas Village, North Semarang District, Semarang City.

2. METHODOLOGY

This research methodology uses a qualitative method that uses a natural setting with the aim of interpreting the phenomena that occur and is carried out by involving various existing methods.. According to Creswell (2008) the validity of qualitative research with two strategies, namely validity and reliability. Data collection techniques through observation, interviews, and documentation (Creswell, 2013).Data sources in this study include primary data sources obtained from interviews with informants. Determination of informants in this study considers the background of the actors, events and processes in accordance with the framework and formulation of the problem (Miles and Hubermen, 2014) which is based on a specific objective, namely the research subjects who master the focus of the study. Informants in this study are Regional Apparatus, community groups (Pokmas), the business world and the industrial world (DUDI), Universities, and the mass media.

Data analysis uses Miles' (2014) interactive model with four stages, namely (1) Data collection is the initial stage in the data analysis process (2) Data reduction is the selection process for simplifying, abstracting and transforming raw data that emerges from written notes in the field (3) Data presentation is a stage of analysis activities that tries to present a set of information with a structured pattern and provides the possibility of drawing conclusions and taking action (4) Drawing conclusions is the final stage in the data analysis process.

3. RESULTS AND DISCUSSION.

Flood is an event or condition when water overflows and inundates the land of an area due to the increasing volume of water exceeding the water reservoir capacity (Law No. 24 of 2007), Rob Flood is a coastal flood caused by rising sea levels caused by the gravitational pull of celestial bodies, especially by the moon and sun on the mass of sea water on earth. Tidal flood (Rob) is a flood disaster caused by the entry of sea water into the land due to high sea tides (Marfai, 2004). So, rob flood is a flood from sea water that enters and inundates the land.

The characteristics of Rob flood water are clear because there is no soil erosion, the water stagnates slowly because there is no strong flow. Rob floods occur in every season, both dry and rainy seasons in areas located on land that is lower than sea level.

Factors Causing Tidal Floods are 1). Global Warming, a natural event that causes the average temperature of the earth to increase, resulting in the melting of ice at the poles of the earth, both the north and south poles. The increase in seawater volume due to melting ice will

raise sea levels. 2). The phenomenon of high tides is an event caused by the influence of the gravity of the moon or sun. This condition usually occurs during a full moon. 3). Land subsidence triggered by excessive exploitation of groundwater by drilling deep can have an impact on tidal floods. The land surface will decrease due to the loss of water volume in the artesian water layer that supports the land.

1. Housing and Settlement Conditions
    a. The average height of land and mainland in Tanjungmas Village is (0.5-1.5 meters above sea level) and there are houses that are lower than sea level so they are often affected by tidal flooding.
    b. Dense settlements and close to community economic activities (fishermen, fish processing, industrial workers, street vendors and small traders in the market).
    c. The condition of the buildings is mostly permanent houses and is quite complete.
    d. Some houses and public places are located lower, namely below the road, so they are easily flooded by high tides or puddles of rainwater.
    e. There are houses that are abandoned or no longer occupied because they are submerged in tidal floods. On average, the land here experiences land subsidence of between 10-12 cm per year.
2. RT and RW Neighborhood Roads
    a. With the construction of the maritime village area, there is a fairly good and complete arrangement of the area with roads, parks and public meeting places.
    b. The main road is approximately 5-6 meters wide, especially the local economic route (TPI, fish management center and fish market)
    c. Some of the local roads are made of paving blocks and the roads have been raised to reduce tidal flooding.
    d. Some roads do not have drainage so that rainwater and tidal flooding overflow onto the roads and residential areas.
3. Drainage and Environmental Facilities
    a. The drainage conditions are poorly maintained so that its function is less than optimal.
    b. Many water channels are clogged and do not flow smoothly, because the location is lower than sea level.
    c. The channel is not optimal because in the afternoon and evening the location experiences tidal flooding.

4. Household Waste Management in the Environment
    a. Waste management has not been handled properly
    b. Household and household business waste production
    c. Waste management is not yet optimal
    d. Public awareness in processing waste has not yet grown independently.
    e. damage to infrastructure, economic, social and other problems.
5. The impact of the tidal flood that occurred in Tanjungmas Village was
    a. This causes traffic disruption at several points that are flooded, thus disrupting the mobility of residents in the Tanjungmas Subdistrict area (especially in the densely populated areas of RW 15 and RW 16).
    b. Damage to local roads and water channels in densely populated residential areas.
    c. Damage to other public infrastructure (public places, community meeting places, and economic facilities such as stalls and shops)
    d. Suboptimal waste management in the residential environment has resulted in clogged water channels in residential areas.
    e. Sea water overflow, water puddles and building waste in the environment result in a decline in environmental quality.

The Semarang City Government has made maximum efforts to overcome the tidal flood, namely by building a marine village, providing water pumps in areas that often experience tidal flooding and improving environmental roads. However, this will not be maximized if the Semarang City Government tries alone without involving other parties. Handling tidal floods requires sustainable solution handling so that tidal flooding can be overcome or prevented in the long term. This can be achieved if there is cooperation or collaboration with other parties.

Rilley (2003) defines collaboration as a relationship in a specific form that places the relationship between non-governmental organizations (concerned with environmental and natural resource issues) with government organizations where in the relationship both act together in the design and implementation of program development. Based on this view, collaboration is a collaboration involving public and non-public organizations that are interrelated and interdependent due to the limited resources they have. Collaboration must be built with commitment from the collaborating parties. Strong commitment encourages collaborator relationships not only based on legitimacy but can be built informally. Meanwhile, Ansell and Gash (2008) define Collaborative Governance as an arrangement that regulates one or more public institutions directly involved in a formal, consensus-oriented

and deliberative collective decision-making process aimed at creating or implementing public policies or managing public programs or assets.

The definition can be concluded that the forum is implemented by public institutions, public and non-public institution actors. The forum aims to make decisions and joint agreements in an organized manner and focuses on public policy. So, collaboration is cooperation involving both public and non-public organizations where each organization is interdependent because of limited resources. Collaboration is made based on the commitment of the collaborating parties voluntarily. Commitment This is not always based on formal legal legitimacy but can be based informally.

In contrast to the definition above, Agrawal and Lemos (2007) in Balogh (2011) explain that Collaborative Governance is not only limited to government and non-government but also involves multi-partner governance, namely the private sector, society and civil communities and is built on the synergy of stakeholder roles and the preparation of hybrid plans such as public-private and private-social cooperation.

A nearly identical definition of Collaborative Governance was provided by Balogh (2011), namely a process and structure in the management and formulation of public policy decisions that involve actors who constructively come from various levels, both in government and/or public agencies, private institutions and civil society in order to achieve public goals that cannot be achieved if implemented by one party alone.

Collaborative cooperation according to Dwiyanto (2010) each party is bound by a common interest to find a solution to a particular problem or issue that is felt by the parties to be very disruptive to their interests. The willingness to cooperate arises because of the desire to find a solution to a problem that is felt together by a public organization with its partners from organizations in the private sector. According to Gray & Wood (1991) quoted by Dwiyanto (2010) cooperation between public organizations and non-governmental institutions that is collaborative has several characteristics including: voluntary cooperation, each party has an equal position. Each has autonomy and the power to make decisions independently even though they agree to submit to a mutual agreement and the parties who cooperate have transformative goals or have a desire to increase systematic capacity by combining the resources they control.

From the several definitions above, it can be concluded that Collaborative Governance cannot be done by one party only. Likewise, it is not only limited to government or non-government but also involves multi-partner governance, namely the private sector, society and civil communities. This collaboration is voluntary, each has an equal position and is

autonomous in making decisions independently, however, they are subject to mutual agreement and are willing to combine the resources they have.

Imperial (2001) said that collaboration is one of the strategies that practitioners use to improve governance and implement policies in inter-organizational settings. Meanwhile, according to Prefontaine lise, et al, (2000) the collaboration model is divided into two types, namely:

1. *Public-public collaboration model*

   Covers agreements between public bodies and can be classified into two main categories, namely horizontal and vertical, the first refers to agreements between two agencies or departments at the same level of government. While the second refers to alliances between local, provincial or national governments.

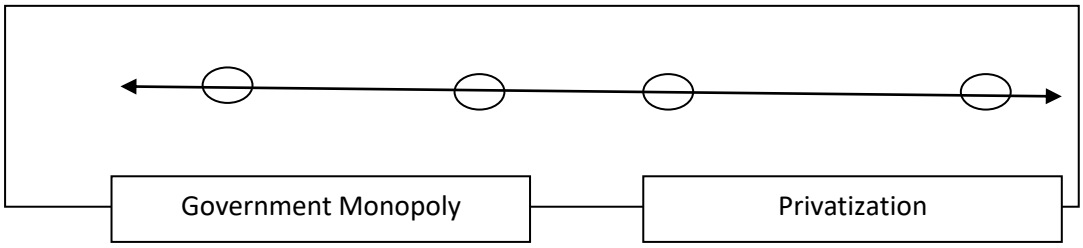
2. *Public – private collaboration model*

   Forms of collaboration that present a greater level of diversity. Sub-contracting and outsourcing are two types of this type of collaboration. In this case the government remains responsible for a service that is either totally or partially managed by the private sector.

Prefontaine lise, et al, (2000) also explained the diversity of collaboration models reflects the extent of shared responsibility of various potential partners originating from the public, private or non-profit sectors. Collaboration between organizations for public services can be found conceptually on a continuum ranging from government monopoly (no sharing) to privatization (total transfer of responsibility). The continuum is illustrated below.

Picture

Prefontaine lise Collaboration Model



Source: Prefontaine Lise, et al, (2000)

From the picture above, it shows that in the implementation of an activity including in the flood disaster management activity, collaboration is needed where there is a shared

responsibility from various potential partners from the public, private or non-profit sectors. This collaboration model reflects the delegation of responsibility to the private sector to carry out a public service task but the government remains responsible for the public service (from government monopoly to privatization).

The reason why this collaboration is carried out in an activity implementation activity, according to Alter and Hage (1993) quoted by Klane and Lu (2010) said that there are four factors that explain collaboration: 1) willingness to work together, 2) the need for expertise, 3) the need for financial resources and risk sharing and 4) the need for adaptive efficiency.

Handling of tidal flooding in Semarang City will be successful if in its implementation there is cooperation between government organizations, non-government, society and civil communities. Collaborative cooperation in handling tidal flooding includes government and non-government organizations. Government organizations include related government agencies or agencies such as the Semarang City BPBD, Tanjungmas Village Government, Semarang City Government and agencies related to efforts to handle tidal flooding, while non-government organizations include universities, community groups, and the mass media and the business world. The collaborative approach in handling tidal disasters in Semarang City uses the Pentaholic approach which involves five parties, namely PRegional Devices (in this case the Regional Disaster Management Agency (BPBD), Bappeda Semarang City, Public Works Agency (PU) Semarang City, Environmental Agency (DLH), North Semarang District and Tanjungmas Village as regulators and implementers of authority in the context of disaster management; Community Groups are the community in Tanjungmas Village and North Semarang District; Universities are universities that have concern in disaster management and risk reduction efforts; Business World and Industry (DUDI) are business circles through CSR Programs for community empowerment and disaster management; Mass media including social media as a vehicle for parties to convey information and understanding about disaster management. Schematically, it can be seen in the image below.

5 PARTY COLLABORATION (PENTAHOLIK)
FLOOD DISASTER MANAGEMENT IN THE COASTAL AREA OF SEMARANG CITY

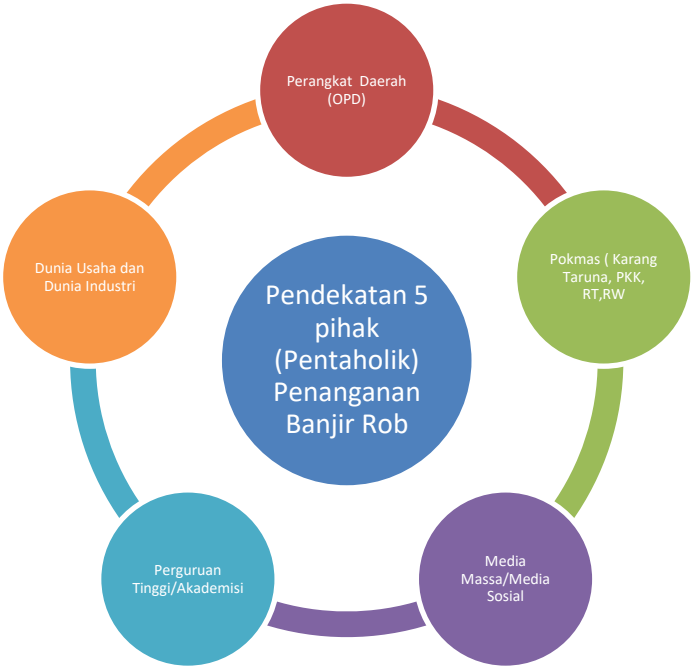


Figure 1: Interrelationship of Parties in Managing Tidal Flood Disasters.

The research results show the role of each party that collaborates, this can be seen below:

1 Regional Devices The Regional Apparatus in this case is the Bappeda of Semarang City, the Public Works Agency of Semarang City, the Environmental Agency, North Semarang District and Tanjungmas Village which in general have the task of representing the government in efforts to overcome, handle tidal flood disasters in Semarang City and handle social problems and empower communities in dealing with the impacts of tidal floods. Each Regional Apparatus has duties and responsibilities according to their duties.

   a. BPBD has a role as responsible for handling communities affected by disasters and carrying out various activities in order to reduce or overcome the occurrence of tidal flooding disasters.
   b. The PU Department has duties and responsibilities in terms of infrastructure such as roads, bridges, embankments, public facilities and others.
   c. DLH. Has the task of handling tidal floods with vegetation, namely planting mangroves and managing waste.

d. North Semarang District and Tanjungmas Village have the task of implementing regulations for handling tidal floods as well as implementing authority in the context of handling tidal flood disasters, including providing information about tidal floods and their impacts.

2 Community Group (Pokmas) It is a community group in Tanjungmas Village and a community group in North Semarang District who are experiencing the same problem, namely the impact of tidal flooding. The group is expected to be able to play a role in efforts to handle the impact of tidal flooding that occurs in their area. Through its independent institutions, it is hoped that it can play an active role in empowering the community in reducing the risk of tidal flooding.

3 Business World and Industrial World (Dudi) The role of the business world and the industrial world through the CSR Program helps the government and society to empower the community in disaster management. This can be done by providing assistance to fulfill basic needs, skills, capital for empowering productive economic businesses, health and social problems that occur due to tidal flooding. The parties involved in the collaboration are Pertamina, Perum Pelabuhan, PLTU and other BUMN.

4 College Universities in Semarang City are expected to play an active role in the Tri Dharma of Higher Education activities, namely community service, especially through community empowerment activities in dealing with the impact of tidal flooding. These community service activities can be carried out by students, lecturers and education personnel through the Independent Learning Independent Lecture (MBKM) Program and thematic Real Work Lectures (KKN) by students with the guidance of Field Supervisors.

5 Mass Media The role can be carried out through news reporting, promotions from small and medium business groups and news about the implementation of activities related to handling and overcoming the Rob flood disaster in Semarang City, especially in North Semarang District.

The collaboration process in the implementation of flood management in Semarang City is basically each party involved has been able to play their respective roles, although not optimally. The results of the study found that the collaboration between the government and the private sector is limited to contractual, short-term cooperation and the intensity of the relationship is still low. Contractual because it tends to be limited to

cooperation between the government as the owner of the work and the private sector as a vendor or contractor. Meanwhile, the implementation of pentaholic collaboration here has been running according to their respective roles. The five elements in this collaboration understand the importance of the problems faced due to flooding and feel that these problems are common problems that must be solved together. They have the same perception of their duties and obligations for handling flood disasters. This condition makes them committed to working together by using their institutional capacity and human resources optimally. The five elements carry out their duties in accordance with the agreed rules and always coordinate while carrying out their duties.

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CONCLUSION

Research on collaboration in handling tidal floods can conclude that handling tidal floods in Semarang City requires collaboration from various parties that is coordinated and sustainable.

1. Collaboration in handling tidal flood disasters in the coastal areas of Semarang City involves five main parties (pentahelix), each of which has a specific and complementary role.
2. The collaboration process has been running, but has not reached an optimal level in its implementation. This indicates the need for further efforts to improve coordination and synergy between parties.
3. A collaborative approach has proven to be important in handling tidal flood disasters, considering the complexity of the problem which cannot be handled by one party alone.
4. The active role of communities through self-help groups is key to empowerment and disaster risk reduction efforts at the local level.

5. The contribution of the private sector through CSR programs and the involvement of universities in community service shows the potential for resources that can be optimized in disaster management, especially Rob flood disasters.
6. The mass media must have a strategic role in disseminating information and increasing public awareness regarding the handling of tidal flooding.

Recommendation:

1. Strengthening coordination between parties through regular forums and more effective communication mechanisms.
2. Increasing community capacity in disaster management through ongoing training and mentoring.
3. Further research to measure the effectiveness of collaboration quantitatively and expand the scope of the study area.
4. Development of a more structured and adaptive collaboration model to changing environmental and social conditions.

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