

# Community Adaptation to Flood Disaster in Tlogosari Kulon Village, Semarang City

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## ABSTRACT

The flood disaster that occurred in Tlogosari Kulon Village, Semarang City was caused by the high intensity of rainfall accompanied by a lack of water catchment areas and drainage that was not smooth in its residential areas. This study aims to identify the factors that cause floods and analyze community adaptation to floods that occur in Tlogosari Kulon Village. The method used in this study uses a quantitative approach with a descriptive type of research. The population in this study includes all flood-affected communities in Tlogosari Kulon Village using Incidental sampling techniques. Data collection techniques through observation, interviews and questionnaires with data analysis using descriptive percentages. The results showed that the factors causing flooding in Tlogosari Kulon Village were 1) high rainfall due to the La Nina phenomenon; 2) overflow of river water in the east canal; 3) water channels in the Tlogosari Kulon community settlement that are not smooth, 4) lack of water catchment areas. Furthermore, the forms of adaptation carried out by the community to flood disasters are: 1) physical aspects, including the community reconstructing settlement development by elevating the foundation of the house to be higher than the road and securing valuable goods such as

transportation, electronics and so on; 2) social aspects, including the community establishing public kitchens as a form of mutual cooperation during disasters and post-disasters; 3) Economic aspects, including most people preparing emergency funds or savings.

**Keywords:** adaptation, disaster, flood

## INTRODUCTION

Flooding can be defined as a condition when land is submerged by abundant volumes of water. Flood is a natural phenomenon that caused by overflow of water in the drainage system that can cause inundation and some negative impact and loses (1). Flood disasters are events that occur suddenly or gradually due to an abundance of water and overflow to the lower land due to high rainfall, snow melt or others so that water cannot be absorbed by the soil and flowed into existing waterways (2). Flood disasters that occur in an area often have an impact, both in terms of material, namely physical, social and economic losses. The impacts caused by floods often go unchecked, especially in areas that are unable to cope with their effects (3). Floods often hit big cities in Indonesia. One of them is Semarang City, Central Java.

Semarang City from year to year can be said to be a subscription area affected by floods.

This is because Semarang City has a low topography accompanied by the development of development, both residential and industrial areas that are very rapid because being the capital of Central Java Province has caused regional subsidence and exacerbated tidal floods. In addition, the Climatology Station of the Central Java Meteorology, Climatology and Geophysics Agency recorded that almost the entire Semarang City area has rainfall of around 152 mm/day to 238 mm/day so that it can be said that the intensity of rain is very high/more extreme due to the peak of La Nina which has the potential for hydrometeorological disasters. This has caused overflow of water in the East Canal watershed area resulting in flooding in the area around the watershed. One of the areas affected by flooding is Tlogosari Kulon Village, Pedurungan District, Semarang City, Central Java. Tlogosari kulon village in recent years has often been hit by floods. Based on the results of interviews by several communities on Sunday, March 24, 2024 at 15.00 WIB, the flood that occurred in the region was the most impactful and largest flood that occurred on March 15, 2024. This is because the water level reaches approximately 100 m or up to the thighs of adult humans. Then the results of further observations made by researchers have been known that the factors causing the flooding of the location are the lack of water catchment areas and water channels are not smooth due to the density of residential buildings in the area and sedimentation from the generation of household domestic waste so that water cannot seep into the ground and eventually pool causing flooding that enters the homes of residents in the area. The flood that occurred in Tlogosari Kulon Village can be said to be a type of local flood. The flood disaster has caused many losses of property, time to public health such as disruption of community activities, such as the cessation of work activities, student teaching and learning activities and daily activities due to inundation of highway access. Meanwhile, it also caused the

highway to be damaged and some people's houses to be damaged so that some moved their homes.

Flood disasters that occur cannot be predicted when they occur so that each region requires preparedness to face disasters in the form of community capacity as a parameter level to eliminate and/or reduce the impact on disaster threats (4). Floods that occur can be anticipated with the disaster adaptation capabilities possessed by the people of Tlogosari Kulon Village. Adaptation actions to flood disasters can be in the form of actions taken to reduce the impact of disasters, both direct and indirect impacts. Adaptation efforts also aim to ensure that the resources needed to respond in a disaster event can be used effectively in times of disaster and know how to use them. Therefore, this study will examine and focus on how the community's adaptation strategy to flood disasters in the Tlogosari Village area, Pedurungan District, Semarang City.

## LITERATURE REVIEW

### Adaptation

Adaptation is an effort or way that living things do to adapt to their environment in order to survive (*survive*). Adaptation is defined as an effort to anticipate the adverse effects of a phenomenon and take appropriate actions to prevent or minimize the damage it causes and take advantage of opportunities that may arise (5). Adaptability is the ability to adapt to certain environmental changes including the characteristics of the structure, function, and behavior of the organization. Adaptability is an external manifestation of adaptive ability and shows ways to reduce vulnerability (6). When associated with the occurrence of disasters, disaster adaptation is defined as the process of adjusting natural and human systems to natural disasters that occur to reduce the impact of disasters. Catastrophic adaptations carried out by humans can appear in many forms. Community preparedness for flood disasters is a form of community adaptation to environmental

conditions (7). Communities affected by disasters have certain abilities in adapting to minimize the impact of loss and loss of property (8). In addition, strengthening social capital in the form of adaptability is the right effort to overcome the impact of disasters, especially floods (9). Adaptation in dealing with flood disasters can be overcome by taking adaptation actions in various aspects such as physical aspects, social aspects, and economic aspects as follows.

1. Adaptation of physical aspects. This form of adaptation can be done by improving infrastructure facilities and infrastructure networks. Communities affected by disasters have certain abilities to carry out physical adaptations to minimize loss and loss of property.
2. Adaptation of social aspects. This form of adaptation is carried out to increase community knowledge through counseling carried out by the local government and non-governmental organizations in the education/community environment to determine steps in overcoming disasters and helping the community to reduce the impact of flood disasters.
3. Adaptation of economic aspects. This form of adaptation can be done by the community by tending to have special savings that are used when disasters occur. When disasters strike, economic activities and people's work are hampered so that people have made economic adaptations so that their lives can still go on.

### **Disaster**

According to the Great Dictionary Indonesian, disaster means something that causes distress, loss or suffering. Disasters are events or series of events that threaten and disrupt the lives and livelihoods of the community caused by natural factors and/or non-natural factors or human factors resulting in human casualties, environmental damage, property losses and psychological impacts (10). Types of disasters can be classified based on their

main causes according to Law Number 24 of 2007, which are as follows.

1. Natural disasters are disasters caused by events or series of events caused by natural factors, in the form of earthquakes, tsunamis, erupting mountains, floods, droughts, typhoons, and landslides.
2. Non-natural disasters are disasters caused by events or series of events caused by non-natural factors, in the form of technological failure, failed modernization, epidemics, and disease outbreaks.
3. Social disasters are disasters caused by events or series of events caused by human/social factors, in the form of social conflicts between groups or between communities, and terror. Social disasters can also be triggered from three main factors: poverty, violence and structural injustice.

Disaster management is disaster management can be defined as all efforts or activities carried out in the context of prevention, mitigation, preparedness, emergency response and recovery efforts related to disasters carried out at stages before, during and after disasters. The stages in an effort to implement disaster management can go through 3 (three) stages as follows:

1. The pre-disaster stage is carried out when there is no disaster and there is potential for disaster.
2. The emergency response stage is implemented and implemented when a disaster occurs.
3. The post-disaster stage is applied after a disaster occurs.

### **Flood**

Flooding is one of the natural phenomena that occurs during the rainy season. According to Law Number 24 of 2007, defining a flood disaster is an event or condition where an area or land is submerged due to an increased volume of water. In general, flooding occurs due to the inability of rivers to accommodate surface flow discharge called river flow capacity.

The size of the flow capacity depends on the cross-sectional dimensions of the river and the speed of the river flow (11). Meanwhile, based on the source of the flood, it can be classified into 3 types, which are as follows.

1. Shipment floods are floods, whose flow comes from upstream areas outside the inundated area. This can happen if rain in the upstream area causes flood flow beyond the capacity of the river or flooding existing canals so that there is runoff.
2. Local flooding is a puddle of water that arises due to rain falling in the area itself. This can happen when the rain exceeds the existing drainage capacity.
3. Rob flooding is a flood that occurs due to direct flow from the tide and/or back from the drainage channel due to being blocked by the tide. Rob is an inundational phenomenon caused by the tidal-flood that flooded and stagnate into coastal areas, which is lower than mean sea level (1).

## MATERIALS & METHODS

The research method uses a quantitative approach with descriptive research as the analysis. This research was conducted in Tlogosari Kulon Village, Pedurungan District, Semarang City and will focus on

the flood disaster that occurred on March 15 2024 and what the level of community adaptation strategies in the area is. The population in this study was the entire community in Tlogosari Kulon Village, Pedurungan District, Semarang City with an Accidental Sampling sample of 20 respondents. The criteria for respondents used as research samples were people in the research area, adults and local residents, and could provide the information needed in the research. Data collection techniques use questionnaires, interviews and observation. The results of data acquisition will be processed through several stages, namely editing, scoring, and tabulating. The data analysis technique in this research uses descriptive data expressed in percentage form.

## RESULT

Tlogosari Kulon Village is one of the villages in Pedurungan District, Semarang City. The village becomes an area affected by floods every year. The danger of flooding in the Tlogosari Kulon sub-district can be classified into several levels. Based on this, it can be seen from Figure 1. Flood hazard Map of Tlogosari Kulon Village below.

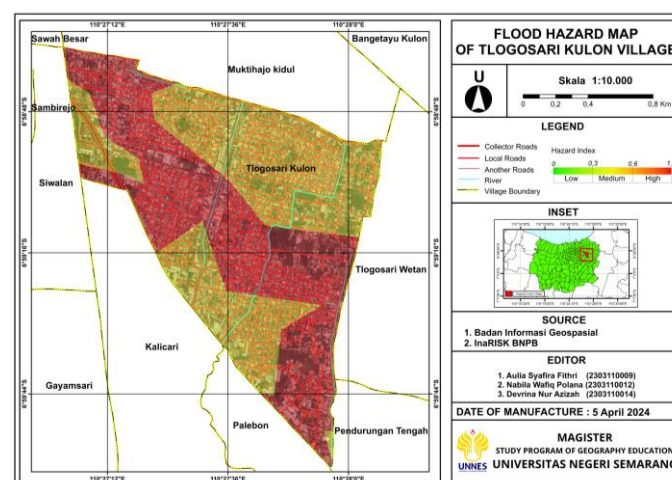


Figure 1. Flood Hazard Map of Tlogosari Kulon Village (Source: Processing researcher data, 2024)

Based on Figure 1, it can be analyzed that Tlogosari Kulon Village is at medium and

high vulnerability levels. The map also shows the river routes that pass through this



area, which have the potential to be a source of flooding, especially in areas with high vulnerability. The high density of residential areas in the red and yellow areas can worsen the impact of flooding, due to the lack of water catchment areas and the potential for drainage blockages. The factors that cause flooding are also caused by several aspect.

### Results of the Questionnaire on Factors Causing Flood Disaster in Tlogosari Kulon Village, Semarang City

#### Physical Aspect

##### 1. Rainfall

Tlogosari Kulon Village has extreme rainfall intensity because the active Rossby and MJO waves are in quadrant 4 which results in increased formation of convective clouds in Central Java. Then, the presence of Tropical Cyclone Seed 91S was observed

in the Indian Ocean in the southeastern part of the island of Java, tropical cyclone seed 93P was observed in the northeastern Gulf of Carpentaria, North Australia and cyclone seed 94S was observed in the Timor Sea south of NTT. This condition causes a confluence of winds in the Central Java region, especially around the Pantura region, which increases the formation of cumulonimbus clouds with the potential for medium-heavy rain intensity that lasts for a long time accompanied by water and can be accompanied by strong winds in the Central Java region. As a result, the rainfall intensity of Semarang City, precisely in Tlogosari Kulon Village, is at 204 mm (BMKG Semarang, 2024). This can be seen from Figure 2. Semarang city rainfall distribution map.

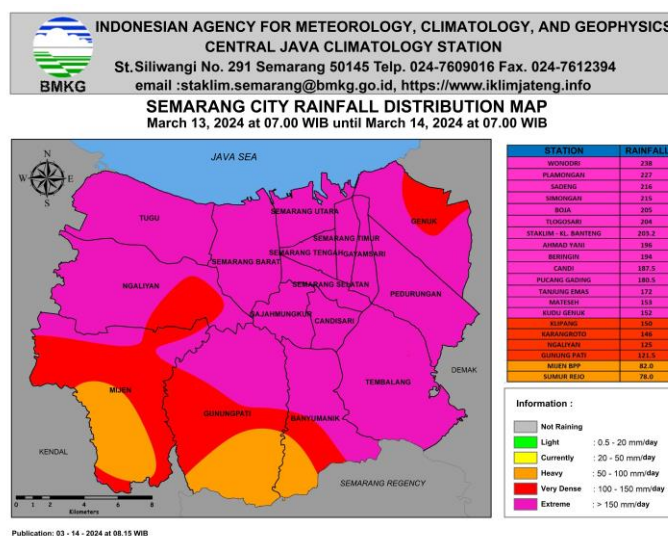


Figure 2. Map of Semarang City Rainfall Distribution (Source: BMKG Semarang, 2024)

Based on Figure 2, it can be seen that the Climatology Station of the Central Java Meteorology, Climatology and Geophysics Agency recorded that almost the entire Semarang City area has rainfall of around 152 mm/day to 238 mm/day in March 2024 so that it can be said that the intensity of rain is very high or more extreme due to the peak of La Nina. The extreme rainfall is certainly the main factor causing flooding in the Tlogosari Kulon Village area. As is known that before the flood, the intensity of rainfall lasted for five consecutive days

starting on March 9, 2024 to March 13, 2024. Based on the results of a researcher interview with one of the respondents, Mr. Hasan, he said that if it had rained for more than three hours, they had anticipated flooding. While the intensity of rain during the flood this time for five consecutive days. This is a factor in the occurrence of major floods in the Semarang area, including Tlogosari Kulon Village.

##### 2. River Flow District (DAS)

The watershed in the Semarang area consists of two canal flood rivers, namely

the West Canal Flood River and the East Canal Flood River. The west canal flood river is a canal from the Garang River which originates from Mount Ungaran followed by two tributaries, namely the Kripik River and the Kreo River. While the eastern canal flood drains water from the hilly area south of Semarang to the Java Sea. Related to the occurrence of floods in Tlogosari Kulon Village, the watershed comes from the flow of springs or rivers from the east canal flood which overflows its water due to high rainfall intensity. In addition, the small

capacity of the river can sometimes also be one of the causes of unavoidable flooding. The higher the rainfall, the more volume of water the river should hold. But because it was unbalanced, eventually water exploded in the region. Shallow river capacity can affect river overflow. When the river's capacity decreases in an area due to shallowing of the river, air will overflow out of the river body (12). This can be seen from the results of the questionnaire in Table 1 below.

**Table 1. River Capacity**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
1.	Does the shallow capacity of the river affect the overflow of river water resulting in flooding?	20	0	100	0

(Source: Processing researcher data, 2024)

Based on Table 1, it can be seen that out of 20 respondents as many as 100% said that shallow capacity of the river can affect the overflow of river water, resulting in flooding in the area. The shallow river capacity is caused by sedimentation and the large amount of rubbish.

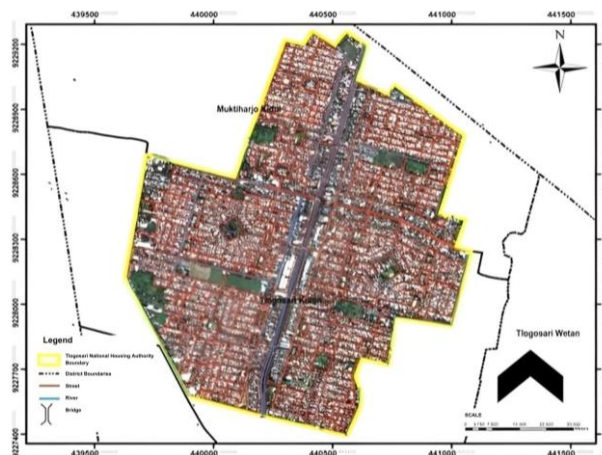
3. Topografi

The topography in Tlogosari Kulon Village is in an area with a gentle slope or low topography, which is no more than 20%. Tlogosari Kulon Village, which is located in an area with low topography, makes this area a flood subscription.

**Social Aspect**

1. Population Growth

Population growth in Tlogosari Kulon Village is included in the high category. Basically, every year it certainly experiences population growth. Population growth results in an increase in population, which directly impacts the need for housing to increase. In 2015, it was seen that settlements in the area were already densely populated. Settlements have been crowded with houses and other buildings. This can be seen in Figure 3. Map of residential settlements as follow.



**Figure 3. Map of Residential Settlement**  
(Source: Daniati & Sariffudin, 2015)

Based on Figure 3. it can be seen that Tlogosari Kulon sub-district has become a residential area densely packed with buildings. The high density of buildings in this area can be seen from the almost complete absence of large empty spaces

between the buildings. These buildings are located very close to each other, thus reflecting the characteristics of a dense residential area. In addition, data on the high population can be seen in the following Table 2.

**Table 2. Area of Tlogosari Village and Its Population**

Area Size			Population			Population Density		
2020	2021	2022	2020	2021	2022	2020	2021	2022
21,11	21,11	21,11	193.151	193.128	193.125	9.149	9.148	9.148

(Source: BPS Kota Semarang, 2023)

From the Table 2, it can be seen that the high number of populations is the cause of flooding problems in Tlogosari Kulon Village. This is because the high population results in land change or land use change. Land use change is a mechanism that maintains between demand and supply for a land by producing new land. Of course, land use change in this area has changed land into residential land. Tlogosari Kulon Village is a densely populated area so that land conversion that occurs is turned into residential land, where there is a lot of semi-permanent housing. Areas with a high density of buildings tend to have more ground surface covered by construction, reducing the soil's ability to absorb rainwater effectively. Therefore, the density of settlements due to population growth

affects several indicators, causing flooding in the village. The indicators in question can include the following.

a. Drainage Channel

The condition of drainage channels in residential areas, precisely the national village of Tlogosari Kulon, based on observations, there are problems both from technical and channel. The technical problem is that the drainage network is not integrated due to the closure of the network from road widening. While the problem of the channel is the condition of narrow, shallow drainage and the amount of garbage so that the channel is not smooth and complicates the flow of water. This can be seen from the results of the questionnaire in Table 3 below.

**Table 3. Drainage Channel Conditions**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
1.	Is the condition of the drainage of your residence in good condition?	14	6	70	30

(Source: Processing researcher data, 2024)

Based on Table 3 above, out of 20 respondents as many as 70% said that the condition of drainage channels in the Tlogosari Kulon Village settlement can be said to be in a bad condition because the density of residential areas causes a lack of drainage channels so that the water flowing is not smooth and if the volume increases it has caused flooding in the area.

b. Lack of Water Catchment Areas

Population growth which causes dense settlements can result in a reduction in water

catchment areas. This is because the construction of residential areas in Tlogosari Kulon Village is permanent so there is no access for water to seep in, where the construction of permanent settlements and the construction of roads made of cement (paving blocks) increase the lack of opportunity for water to seep into the ground. Therefore, if it rains of course water will pool in the area.

c. There Are People Living on the Riverbanks

The existence of settlements on riverbanks is the cause of flooding in Tlogosari Kulon Village. This is because settlements in this area can disrupt the natural flow of river water and reduce the river's ability to hold water. Rainwater cannot be channeled effectively, but flows directly into rivers. An

increase in the amount of water flowing into a river in a short time can cause the volume of water to exceed the river's capacity, causing the water to overflow into local residents' settlements. This can be seen from the results of the questionnaire in Table 4 as follows.

**Table 4. People Live on the Banks of the River**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
1.	Are there still people in your area who live in riverbank settlements?	13	7	65	35

(Source: Processing researcher data, 2024)

Based on Table 4 above, out of 20 respondents as many as 65% said that there are still people living in riverbank settlements. This often causes blockage of river water flow. Building structures, garbage, and other materials can block the flow of water, causing water to overflow into the surrounding area. This can also cause flooding in Tlogosari Kulon Village, Semarang City.

#### d. Garbage Disposal in Sewers

Garbage becomes a common problem when floods occur. No wonder if an area experiences flooding is always related to littering. One of them is the Tlogosari Kulon Village area, where there is a lot of garbage in the sewers in residential areas. These garbages are household domestic waste. This can be corroborated by the results of the questionnaire on Table 5 as follows.

**Table 5. Garbage Problem**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
1.	Do you dump garbage, waste and materials in their place?	16	4	80	20
2.	Have you ever seen other people littering in the river/sewer where you live?	19	1	95	5

(Source: Processing researcher data, 2024)

Based on Table 5 above, out of 20 respondents as many as 80% of people have disposed of garbage in its place. However, 20% of people have not dumped the shampoo in place. This means that there are still people who throw carelessly in rivers and sewers where they settle. In addition, as many as 95% of people have seen other people living in the village littering in the stream/sewer where they live. This has caused a flood disaster in Tlogosari Kulon Village, Semarang City.

#### **Results of Community Adaptation Questionnaire to Flood Disaster in Tlogosari Kulon Village, Semarang City**

Based on the results of data collection in the field to 20 respondents, researchers can analyze the results of data acquisition from community adaptation variables in

Tlogosari Kulon Village, Semarang City in terms of physical, social and economic aspects. These aspects can be explained in detail as follows.

#### **1. Physical Aspect**

##### **Flood-Resistant Residential Buildings**

The condition of residential buildings affected by flooding needs to be known to reduce the risk due to flood disasters. This can be seen from the number of floors of houses, building structures, and barrier buildings. Knowing these aspects is important because a home with more floors may offer better protection for its occupants during flooding, while a strong, sturdy building structure is more resistant to water damage. In addition, the presence of barrier buildings such as walls or embankments can reduce the risk of flood water entering the



house. The results of the questionnaire on these indicators can be seen in the following Table 6.

**Table 6. Flood-Resistant Residential Buildings**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
1.	Is the current condition of your house more than 1 floor?	9	11	45	55
2.	Is the structure of your residential building resistant to flooding?	18	2	90	10
3.	Is there a barrier building in particular to prevent floodwaters from entering the house?	14	6	70	30

(Source: Processing researcher data, 2024)

Based on the results of the questionnaire in Table 6. Residential buildings against flood disasters, from the answers of 20 respondents it can be concluded that the community erected residential buildings with one floor. When the flood hits, the overflow of water enters the residence. The majority of community buildings have material building structures that are resistant to flooding. The majority of respondents have a special barrier building to prevent

flooding so as to reduce the risk of flooding into the house.

**Environmental Conditions**

The causes of flooding are adjusted to the conditions of an area. This is due to the conditions of rainfall, deforestation, regional topography, littering behavior so that environmental maintenance is needed so that flooding can be overcome. The results of the questionnaire on indicators of environmental conditions can be seen in the following Table 7.

**Table 7. Environmental Conditions**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
4.	Do you participate in the maintenance of the surrounding environment?	13	7	65	35
5.	Do you participate in repairing/cleaning drains or sewers in the neighborhood?	7	13	35	65
6.	Do you live near a river?	6	14	30	70
7.	Do you participate in normalizing the river in the surrounding environment so that flooding does not occur?	3	17	15	85
8.	Do you participate in normalizing the river in the surrounding environment so that flooding does not occur?	16	4	80	20

(Source: Processing researcher data, 2024)

Based on the results of Table 7 above from 20 respondents, it can be concluded that the majority of respondents have participated in protecting the environment as much as 65%. However, 35% of respondents still have not carried out activities that can reduce the risk of major floods in the future. It can also be seen that 70% of respondents do not live near a river. Therefore, many respondents did not participate in river normalization, around 85%. Most of the 80% of respondents answered that river problems

often occur because river flow is rarely cleaned due to the accumulation of rubbish in the river flow.

**Valuable Goods Adaptation**

Store valuables to a safer place, such as securities, clothing, electronics to a higher place so as not to experience property loss. The results of the questionnaire on the indicators of adaptation of valuables can be seen in the following table 8.

**Table 8. Valuable Goods Adaptation**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
9.	Have you and your family secured your securities to a safer place?	20	0	100	0
10.	Do you and your family move electronics and transportation to a safer place?	19	1	95	5

(Source: Processing researcher data, 2024)

Based on the results of Table 8 above from 20 respondents, it can be concluded that the community has stored their securities to a safer place and the community has prepared their electronic goods to be moved to a safer place before the flood comes. These steps reflect the level of community awareness and preparedness in facing potential flood disasters. They have learned from experience the importance of protecting valuables and electronics from damage. This action has also demonstrated that there is an early warning or education system regarding flood risk mitigation in the community,

thereby encouraging them to be more prepared and alert.

**Social Aspect Knowledge, Counseling, and Institutional Engagement**

Knowledge and attitudes of the community when a flood occurs need to be known to reduce the risk of flood disasters. The results of the questionnaire on indicators of knowledge, counseling and institutional involvement can be seen in the following Table 9.

**Table 9. Social Aspect**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
11.	Do you know what is meant by a flood disaster?	20	0	100	0
12.	Can floods cause damage to facilities and infrastructure?	20	0	100	0
13.	Do you know the signs of a flood disaster in your neighborhood?	18	2	90	10
14.	Are there early warning signs in your area of residence?	2	18	10	90
15.	Is there an evacuation route in your area?	4	16	20	80
16.	Do you already know what actions to take when a flood occurs?	19	1	95	5
17.	Do you think preparedness measures are needed in dealing with flood disasters?	20	0	100	0
18.	Are there any considerations for you or your family regarding flooding disasters in choosing a place to live?	18	2	90	10
19.	Are there any community/government agencies that help when floods come?	15	5	75	25
20.	Are there any community/government agencies that help with medicines/P3K during floods?	12	8	60	40
21.	Are there any community/government agencies that help distribute clothes suitable for use during floods?	12	8	60	40
22.	Are there any community/government agencies that help provide logistical assistance during floods?	16	4	80	20

(Source: Processing researcher data, 2024)

Based on the results of Table 9 above from 20 respondents, it can be concluded that the community already understands and knows about the flood disaster. The community also knows that floods can cause damage to facilities and infrastructure, and people already know the signs of impending floods. However, many communities have not

maximized warning signs to reduce flood risk such as the use of evacuation routes. This means that most people know the actions to take when a flood occurs and how to handle it. This is because some people have lived for a long time. It can also be concluded that many institutions will later help a lot during floods in terms of the

government and the community such as BNPB, BASARNAS, PMI. In addition, there are also institutions either from the community or the government that help in providing financial assistance and distributing decent clothes when a flood occurs and helping to provide logistical assistance when a flood occurs.

**Economic Aspect**

The flood disaster in Tlogosari Kulon Village, Semarang City has also had an

impact on the economic aspect. One of the impacts of losses in the economic sector is that the house and the belongings in it are damaged. In addition, another impact of flooding is that community activities become hampered so they must handle it first before doing activities and must prepare emergency money. The results of the questionnaire on the economic aspect can be seen in the following table 10.

**Table 10. Economic Aspect**

No.	Question	Sum		Percentage (%)	
		Yes	No	Yes	No
23.	Have you and your family secured your securities to a safer place?	17	3	85	15
24.	Did you and your family experience property loss during the flood?	18	2	90	10
25.	Do you and your family prepare an emergency fund?	12	8	60	40

(Source: Processing researcher data, 2024)

Based on the results of Table 10 above from 20 respondents, it can be concluded that the community has experienced economic impacts, namely by stopping economic activities in Tlogosari Kulon Village and experiencing property losses. This means that the flood disaster in March 2024 will be the largest flood in its history where the overflow of water reaches 100 m so that the community's economic activity is completely paralyzed. Before the flood disaster, as many as 60% of people had prepared an emergency fund that could be used to meet needs at urgent times, such as during floods

**DISCUSSION**

Based on the purpose of the study, namely what are the factors causing flooding in Tlogosari Kulon Village, it can be concluded that the causative factors are dominated by physical factors and social factors. Physical factors that can cause flooding in the area include high rainfall. High rainfall has had an impact on overflowing water in the river. Rainfall flows downstream to exceed the carrying capacity of the river, overflowing and inundating the left and right sides of the river (13). Meanwhile, the capacity of the

river in the Tlogosari Kulon Village settlement is relatively small. If there is high rainfall, the river is unable to hold abundant water so that it overflows and causes the surrounding land to be inundated by the water. Furthermore, the low topography of Semarang City and the decrease in land level. Land subsidence has decreased by 7.7 cm/4 years (14). Many causative factors support the occurrence of this phenomenon including soil type, land use, groundwater use, and so on. In addition, social factors that cause flooding in the village are population density due to population growth has resulted in several factors causing flooding, namely poor drainage systems due to the density of residential buildings, residential areas still exist in riverbank areas and lack of water catchment areas in the area where they live. The attitudes and behaviors of the people who still do not protect the environment are also the cause of flooding (15). This can be seen from most people still throwing garbage in sewers or rivers.

Meanwhile, for the second purpose regarding the form of community adaptation in facing flood disasters, it is known that the level of community adaptation in Tlogosari Kulon Village is included in the high

category. This is in line with research (16) that adaptation strategies are divided into tiga, namely physical, economic, and social. The results of the analysis show such as the physical aspect of adaptation by building special barriers to flood barriers, securing securities, electronic goods, etc. The social aspect also shows the community's ability to determine actions in an effort to deal with flood impacts, disaster counseling, and involvement from related institutions. In the economic aspect, the community will anticipate more by preparing an emergency fund to meet their needs during a flood in Tlogosari Kulon Village.

## CONCLUSION

Tlogosari Kulon Village, Pedurungan District is one of the parts that become a flood subscription area in Semarang City. The factor that causes flooding in this region is of course the relationship between physical and social factors. Physical factors that cause flooding include being on low topography where Tlogosari Kulon Village is on a gentle slope, having extreme rainfall intensity. While social factors come from dense settlements due to population growth, affecting drainage channels that are not smooth and lack of water catchment, seeing settlements in this area in the form of semi-permanent housing. From that factor that caused the water to pool and the river flooded the east canal overflowed and there was a flood. The adaptation strategy carried out by the Tlogosari Kulon community has been carried out in various aspects, namely more dominated by physical aspects where each residential area has carried out development reconstruction such as raising the foundation of the house to be higher than the road so that when there is a flood water does not directly enter the house. In addition, from the social aspect, the community helps other communities to save valuables and work together in cleaning the environment where they live. Adaptation to economic aspects has been carried out by

better anticipating floods by preparing emergency funds.

## Declaration by Authors

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