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## ANALYSIS THE POTENTIAL FACTORS OF COMMUNITY CAPABILITIES IN FLOOD PREVENTION AND ENVIRONMENT-BASED DISEASE IN BANJAR REGENCY

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### ABSTRACT

Data from the Regional Disaster Management Agency (BPBD) of South Kalimantan Province (2018) total disaster events in the South Kalimantan Region. As of January 27, 2021, there were 227 disasters recorded. The dominant natural disaster is flood disaster. The flood disaster caused a death toll of 259 people (dead and missing) and 8 missing and 3,654 people injured. The purpose of this study is to analyze the potential of knowledge, community resources, risk areas, community institutions related to clean water treatment in preventing floods and environmental-based diseases in Banjar Regency. This research method consists of three stages, namely a preliminary survey, data collection, and data analysis. The results showed that there was a relationship between gender and flood prevention activities ( $p < 0.05$ ), there was no relationship between flood prevention activities and knowledge of clean water management ( $p \geq 0.05$ ), the relationship between flood prevention activities and community institutions that played a role in flood prevention ( $p < 0.05$ ), there is no relationship between flood prevention activities and the potential of natural resources in flood prevention ( $p \geq 0.05$ ).

*Keywords: Floods, knowledge, community institutions, risk areas, community resources*

### A. INTRODUCTION

Flood is an ordinary natural phenomenon, but it will be very detrimental if it threatens the existence of human life. Floods that occur are caused by heavy and continuous rain and seasonal irregularities marked by the El Niño phenomenon (prolonged dry season) and Lanina, namely rain that falls continuously (Purwani, Fridani and Fahrurrozi, 2019).

South Kalimantan is one of the provinces in Indonesia which is a province that has a high risk of flooding in terms of its physical condition. Physical conditions in South Kalimantan are mostly inundated during high rainfall. The water level when a flood occurs reaches 2-3 meters. Geographically, most of South Kalimantan is below sea level, causing the flow of water on the land surface to be less smooth. In addition to geographical factors, the cause of flooding is also due to rampant coal mining in the upstream and illegal logging (Angriani and Kumalawati, 2016).

As of January 27, 2021, there were 227 disasters recorded. The natural disasters that dominate are floods, followed by hurricanes and landslides. The flood disaster caused a death toll of 259 people (dead and missing) and 8 missing and 3,654 people injured. As many as 42,762 houses were damaged, facilities (education, worship, health) were damaged as many as 1,542, offices were damaged as many as 134, and bridges were damaged as many as 442, refugees as many as 1,517,935 people (BNPB, 2021). Determination of Emergency Response Status Number: 188.44/058/KUM/2021 which is valid from January 14, 2021 to January 27, 2021 and has been extended by Decree of the Governor of South Kalimantan Number: 188.44/085/KUM/2021 concerning Extension of Decree on Emergency Response for floods, land disasters landslide, hurricane, and tidal waves in South Kalimantan Province, from January 28, 2021 to February 3, 2021 (Jati, 2021).

Based on the 2018 Basic Health Research (Risksedas) it was shown that in Banjar Regency the use of clean water per person per day was 2.41%. And the comparison of the use of clean water that is less due to the lack of clean water sources between urban 1.90% and rural 2.50% is approximately only 0.6% different (Ministry of Health, 2018). Based on this background, researchers are interested in conducting research to analyze the potential factors of the community's ability (potential knowledge of the community, potential community resources, potential risk areas and community institutions that play a role) in flood prevention in Banjar Regency. It is hoped that with this research, it is hoped that the potential of the community in Banjar Regency in preventing flooding can be known.

**B. RESEARCH METHODS**

This research method consists of three stages, namely the preliminary survey stage, the stage of collecting through FGD and data processing and the stage of calculating and analyzing data. Preliminary survey to obtain an overview of the research location, data collection consists of primary and secondary data, and at the data analysis stage to answer 4 objectives, namely analyzing the potential for community knowledge related to clean water management, community resources, risk areas, community institutions in preventing floods and diseases environment based in Banjar Regency.

**C. RESULTS**

**1. RESPONDENT CHARACTERISTICS**

**Table 1. Frequency Distribution of Age Category**

Age	Frequency	Percentage (%)
Late teens	3	10
Early adulthood	9	30
Late adult	14	46.7
Early seniors	1	3.3
Late seniors	2	6.7
seniors	1	3.3
Total	30	100

According to the Ministry of Health, the age category is divided into the late adolescent age category (17-25 years), the early adult age category (26-35 years), the late adult age category (36-45 years), the early elderly age category (46-55 years), 56-65 late elderly, and seniors > 65. Based on Table 1 it is known that as many as 3 respondents (10%) in the late adolescence category, as many as 9 respondents (30%) in the early adult category, as many as 14 respondents (46.7%) in the adult category At the end of the day, 1 respondent (3.3%) was in the early elderly category, 2 respondents (6.7%) was in the late elderly category and 1 respondent (3.3%) was in the elderly category.

**Table 2. Frequency Distribution of Gender Category**

Gender	Frequency	Percentage (%)
Man	14	46.7
Woman	16	53.3
Total	30	100

Based on Table 2, it is known that as many as 14 respondents (46.7%) are male and 16 respondents (53.3%) are female.

**Table 3. Frequency Distribution of Education**

Education	Frequency	Percentage (%)
Not in school/didn't finish elementary school	3	10
Elementary School	8	26.7
junior high school	10	33.3
senior High School	7	23.3
Academics/College	2	6.7
Total	30	100

Based on Table 5.3 it is known that as many as 3 respondents (10%) did not go to school / did not finish elementary school, as many as 8 respondents (26.7%) last education was elementary school, as many as 10

respondents (33.3%) last education was junior high school, as many as 7 respondents (23.3%) His last education was high school and as many as 2 respondents his last education was Academics/College.

**Table 4. Frequency Distribution of Income**

Income	Frequency	Percentage (%)
2,877,448	16	53.3
<2,877,448	14	46.7
Total	30	100

Based on Table 5.4, it is known that as many as 16 respondents (53.3%) have an income of 2,877,448 and as many as 14 respondents (46.7%) have an income of < 2,877,448.

## 2. CLEAN WATER MANAGEMENT KNOWLEDGE

**Table 5. Distribution of Clean Water Management Knowledge**

Knowledge	Frequency	Percentage (%)
Not good	13	43.3
Good	17	56.7
Total	30	100.0

Based on Table 5, it is known that as many as 13 respondents (43.3%) of the community have less knowledge of clean water management and as many as 17 respondents (56.7%) of the community have good knowledge of clean water treatment. The average score of respondents is 6.47 and the highest score overall is 10 and the lowest score is 2. The most incorrect questions are about how to manage water if bacteria are found and to remove chemicals in the water. This is probably because the community does not yet know how to manage water.

## 3. FLOOD PREVENTION ACTIVITIES

**Table 6. Distribution of Prevention Activities**

Activity	Frequency	Percentage (%)
Not good	21	70.0
Good	9	30.0
Total	30	100.0

Based on Table 6, it is known that as many as 21 respondents (70%) stated that the activities in the village were running poorly and as many as 9 people (30%) stated that the activities in the village were running well.

## 4. POTENTIAL OF COMMUNITY RESOURCES IN FLOOD PREVENTION

**Table 7. Distribution of Rain Potential**

Rain Potential	Frequency	Percentage (%)
High	27	90
Low	2	6.7
Safe	1	3.3
Total	30	100

Based on Table 7, it is known that as many as 27 respondents (90%) stated that the potential for rain in their village was high, as many as 2 respondents (6.7%) stated that the potential for rain in their village was low and as many as 1 respondent (3.3%) stated that the potential for rain in their village was safe. The potential for rain is high because it usually occurs on a weekly basis.

**Table 8. Landslide Potential Distribution**

Landslide Potential	Frequency	Percentage (%)
Safe	30	100
Total	30	100

Based on Table 8, it is known that as many as 30 respondents (100%) stated that the potential for landslides in their village had never occurred.

**Table 9. Distribution of Tornado Potential**

Tornado Potential	Frequency	Percentage (%)
High	1	3.3

Tornado Potential	Frequency	Percentage (%)
Low	2	6.7
Safe	27	90
Total	30	100

Based on table 9, it is known that the tornado potential is only 1 respondent (3.3%) stating that the tornado potential in their village is high, 2 respondents (6.7%) are low and as many as 27 respondents (90%) are safe. The potential for high and low tornadoes is due to tornadoes that occur in rice fields. This usually happens on a weekly or monthly basis.

**Table 10. Distribution of Flood Potential**

Flood Potential	Frequency	Percentage (%)
High	6	20.0
Low	1	3.3
Safe	23	76.7
Total	30	100

Based on table 10, it is known that the potential for flooding in the high category is 6 respondents (20%), 1 respondent (3.3%) is low and 23 respondents (76.7%) are safe. The potential for flooding based on the results of this study does not often occur.

**Table 11. Distribution of Fallen Tree Potential**

Fallen Tree Potential	Frequency	Percentage (%)
Low	1	3.3
Safe	29	96.7
Total	30	100

Based on Table 11, it is known that as many as 1 respondent (3.3%) stated that the potential for falling trees in their village was low and as many as 29 respondents (96.7%) stated that the potential for falling trees in their village was safe/no fallen trees.

**Table 12. Distribution of Damaged Bridge Potential**

Broken Bridge Potential	Frequency	Percentage (%)
Low	2	6.7
Safe	28	93.3
Total	30	100

Based on Table 12, it is known that as many as 2 respondents (6.7%) stated that the potential for damaged bridges in their village was low and 28 respondents (23.3%) stated that the potential for damaged bridges in their village was safe.

**Table 13. Distribution of Natural Resources Potential in Flood Prevention**

Natural Resources Potential	Frequency	Percentage (%)
Low	6	20
Safe	24	80
Total	30	100

Based on Table 13, it is known that the respondents who stated that the potential of natural resources were included in the low category were 6 respondents (20%) and as many as 24 respondents (80%) stated that the potential of natural resources was in the safe category. The potential of natural resources in this study is the potential for rain, landslides, tornadoes, floods, fallen trees and damaged bridges. The low potential of natural resources is the potential of natural resources that occurs every month while the potential of safe natural resources is the potential of natural resources that rarely or never occurs.

## 5. KNOWLEDGE OF COMMUNITY INSTITUTIONS

**Table 14. Distribution of Community Institution Category**

Community Institutions	Frequency	Percentage (%)
Not good	24	80
Good	6	20

Community Institutions	Frequency	Percentage (%)
Total	30	100

Based on Table 14, it is known that as many as 24 respondents (80%) stated that the community institutions in their village were lacking and as many as 6 respondents (20%) stated that the community institutions in their village were good.

## 6. STATISTICAL TEST ANALYSIS

**Table 15. Gender Relationship with Flood Prevention Activities**

Gender	Flood Prevention Activities				Total		p-value
	Not enough		Well		n	%	
	n	%	n	%			
Man	6	42.9	8	57.1	14	100	0.004
Woman	15	93.7	1	6.3	16	100	

Based on table 15, it is known that flood prevention activities were more or less carried out by female respondents as many as 15 respondents (93.7%) compared to 6 respondents (42.9%). While good flood prevention activities are mostly carried out by male people as many as 8 respondents (57.1%) compared to female respondents only 1 respondent (6.3%). Fisher exact test results in table 15 show that p-value = 0.004. Based on the p-value in the statistical test results, it was concluded that Ho was rejected ( $p < 0.05$ ), which means that there is a relationship between gender and flood prevention activities.

**Table 16. Relationship of Clean Water Management Knowledge with Flood Prevention Activities**

Clean Water Management Knowledge	Flood Prevention Activities				Total		p-value
	Not enough		Well		n	%	
	n	%	n	%			
Not enough	11	84.6	2	15.4	13	100	0.229
Well	10	58.8	7	41.2	17	100	

Based on table 16, it is known that flood prevention activities are more or less common in respondents who have less knowledge of clean water management, namely 11 respondents (84.6%) compared to respondents who have good knowledge of clean water management, namely 10 respondents (58.8%). While good flood prevention activities are more common in respondents who have good knowledge of clean water management as many as 7 respondents (41.2%) compared to respondents who have less knowledge of clean water management, 2 respondents (15.4%). Fisher exact test results in table 16 show that p-value = 0.229. Based on the p-value in the statistical test results, it was concluded that Ho was accepted ( $p \geq 0.05$ ), which means that there is no relationship between flood prevention activities and knowledge of clean water management.

**Table 17. Relations with Community Institutions Playing a Role in Flood Prevention Activities**

Community Institutions	Flood Prevention Activities				Total		p-value
	Not enough		Well		n	%	
	n	%	n	%			
Not enough	20	83.3	4	16.7	24	100	0.005
Well	1	16.7	5	83.3	6	100	

Based on table 17, it is known that flood prevention activities that more or less occur in community institutions that have less role are as many as 20 respondents (83.3%) compared to community institutions that play a good role only 1 respondent (16.7%). While good flood prevention activities mostly occur in community institutions that have a good role as many as 5 respondents (83.3%) compared to community institutions that have less role as many as 4 respondents (16.7%). Fisher exact test results in table 17 show that p-value = 0.005. Based on the p-value in the statistical test results, it was concluded that Ho was rejected ( $p < 0.05$ ), which means that there is a relationship between flood prevention activities and community institutions that play a role in flood prevention.

**Table 18. Relationship of Natural Resources Potential with Flood Prevention Activities**

Natural Resources Potential	Flood Prevention Activities				Total		p-value
	Not enough		Well		n	%	
	n	%	n	%			
Low	5	83.3	1	16.7	6	100	0.637
Safe	16	66.7	8	33.3	24	100	

Based on table 18, it is known that flood prevention activities which more or less occur in low natural resource potentials are as many as 5 respondents (83.3%) compared to the safe natural resource potential of 16 respondents (66.7%). While good flood prevention activities mostly occur in safe natural resource potential as many as 8 respondents (33.3%) compared to low natural resource potential as many as 1 respondent (16.7%). Fisher exact test results in table 5.18 show that p-value = 0.637. Based on the p-value in the statistical test results, it was concluded that  $H_0$  was rejected ( $p \geq 0.05$ ), which means that there is no relationship between flood prevention activities and the potential of natural resources in flood prevention.

#### D. DISCUSSION

##### 2. GENDER RELATIONSHIP WITH FLOOD PREVENTION ACTIVITIES

The results of this study can be seen that male respondents (57.1%) are more aware of the risk of flooding than female respondents. This is in line with research conducted by Austin D in 2010 which states that men have higher preparedness than women. In these cases, women may be more unprepared than men because of the differences in socially defined roles and responsibilities between them. It could also be due to inequalities among them in terms of decision-making power, participation in emergency preparedness organizations and access to resources. Several studies report that men have high confidence, proactive behavior, and preparedness in an emergency. Several studies report that men have high confidence, proactive behavior, and preparedness in an emergency. Such behavior is usually driven by the social role of men in the family (Nastiti RP and Rafiah MP, 2021).

##### 2. RELATIONSHIP OF CLEAN WATER MANAGEMENT KNOWLEDGE WITH FLOOD PREVENTION ACTIVITIES

The results showed that there was no relationship between knowledge of clean water management and flood prevention activities (p-value = 0.229). Knowledge is the basis for a person to be prepared in the face of floods, especially knowledge about the impact of floods on health and actions to avoid the effects of the flood. There are several factors that influence knowledge, including education, occupation, age, interests, experience, surrounding culture, and information. Respondents in this study were mostly <45 years old (86.7%) which is an adult age group who generally have high knowledge because they are usually sourced from various electronic media, print or social media and in general this age range also has a strong memory of an object for example in the fields of disaster and health so as to produce good knowledge (Lindawati&Wasludin, 2017).

When a flood occurs, people's water sources, especially wells, are polluted by flood water so that they become cloudy. One important step in processing to obtain clean water is to remove turbidity from the raw water. Turbidity is caused by the presence of small particles and colloids ranging from 10 nm to 10 m. These small particles and colloids are none other than quarts, clay, plant residues, algae and so on. During a flood disaster, water sources become disturbed and contaminated due to flooding, the need for clean water becomes very important and must be done quickly in dealing with flood victims. Without clean water, the victim will experience health problems, namely disease. The flood water treatment process is an excellent alternative to obtain clean water in an emergency. Meanwhile, the need for clean water that refugees need is not much. The water needs of post-flood victims are between 15-20 liters per person per day (Dwiratna et al., 2018).

The community certainly has a role in mitigating flood disasters because it is the people who know and feel the impact more directly (Pratama and Iswandi, 2020). The results of this study found that flood prevention activities in the villages studied were river cleaning (cleaning garbage and plants), appeals not to litter, dredging rivers, tree planting activities and mutual cooperation.

##### 3. RELATIONSHIP OF NATURAL RESOURCES POTENTIAL WITH FLOOD PREVENTION ACTIVITIES

The results of this study indicate that there is no relationship between the potential of natural resources and flood prevention activities (p-value = 0.637). The potential natural resources studied in this study are rain,



landslides, cyclones, floods, fallen trees and damaged bridges. Climate change has the potential to intensify flood risk in a city in three ways: higher sea levels and storm surges, higher than normal rainfall, and changes in river flow that tend to increase, for example due to glacial melt. Heavy rainfall is a major factor in the occurrence of floods. The inability of the soil to absorb rainwater quickly which inundates the expanse of land causes flooding. The rivers are unable to accommodate the rainfall, in addition to the flow which may have been blocked causing flash overflows to inundate the land. Floods usually always hit when the intensity and rainfall are high, but the lack of public awareness and knowledge about floods often causes problems, such as the lack of alertness of residents when floods occur (Faisal, 2019).

In addition, the potential for landslides based on the results of this study is included in the safe category, namely landslides rarely or never occur. Landslide is a mass movement of soil or rock or both, which descends the slope due to the soil or rock making up the slope experiencing disturbance or instability. Landslide is a process of mass transfer of soil or rock in an oblique direction from its original state, resulting in a steady mass separation due to the influence of gravity with the type of movement in the form of rotation and translation (Nella et al, 2021). The cause of landslides is the decline in environmental quality and sustainable functions of the area and causes the threat of flooding (Rizkiah et al, 2015).

The results of this study stated that the potential for tornadoes was mostly included in the safe category, but there were several areas where tornadoes occurred in the rice fields in Kelampayan Ulu Village. According to the Regulation of the Head of BMKG Number: Kep.009 of 2010 that a tornado is a rotating strong wind that comes out of Cumulonimbus clouds with a speed of more than 34.8 knots or 64.4 km/hour and occurs in a short time. Tornadoes move in a circular fashion in a spiral turning counterclockwise in the southern region of the equator. Tornado weather phenomenon comes from Cumulonimbus clouds. However, not all Cumulonimbus clouds can cause tornadoes. Waterspouts and tornadoes are the same, the only difference is where they occur. This tornado weather phenomenon is local so it is difficult for forecasters to predict. To make it easier for forecasters to provide related weather information, a study was conducted on the use of global model data, satellite imagery, and upper air observation data in the identification of tornado and waterspout events (Alexandra, 2017). Convective clouds including Cumulonimbus (Cb) can produce heavy (extreme) rainfall in an area so that it can cause flooding, especially when the Inter Tropical Convergence Zone (ITCZ) is in Indonesian territory (Sinta, 2017).

The potential for fallen trees in this study is mostly included in the safe category, which is rarely or never the potential for falling trees occurs. The high potential for falling tree disasters in residential areas often occurs, especially before the rainy season. This potential disaster in the form of the danger of a fallen tree is a disaster that can be anticipated in advance. Anticipation can be done through maintenance management and regular monitoring of tree development. The occurrence of this fallen tree disaster is often the result of a post-hurricane disaster. In addition to hitting objects that are around it, it is not uncommon for fallen trees to take lives. This is because the position of the fallen tree is in public spaces that are passed by the community every day. Various kinds of losses have been recorded as a result of falling trees, apart from the loss of life, fallen trees can damage infrastructure facilities and infrastructure (Aritama AAN, 2019).

The results of this study indicate that the potential for damaged bridges is included in the safe category, which is rare. Floods affect various sectors of life. Floods can be said to be a disaster, because the impact it causes is very wide. The impact of floods on the physical environment, where the floods that occur have a very large impact on the physical environment, including floods that can cause damage to bridges, roads and house buildings, damage agricultural fields and so on. Bridges as a means of transportation have a very important role for the smooth movement of traffic. Where the function of the bridge is to connect separate transportation routes or trajectories either by rivers, swamps, lakes, straits, channels, highways, railways and other crossings. Bridges have a very important role in supporting the existing land transportation system, so bridges must be made strong and not easily damaged (Hairil A and Slamet I, 2021).

#### **4. RELATIONSHIP BETWEEN COMMUNITY INSTITUTIONS AND FLOOD PREVENTION ACTIVITIES**

The results of this study indicate that there is a relationship between community institutions that play a role in flood prevention activities (p-value = 0.005). The results of this study state that the existing community institutions or policies are involved institutions such as youth organizations. As for funds, in the event of a disaster, use emergency funds/unexpected funds. Based on the results of previous research, it was found that disaster management carried out in Jatinangor District was seen about the actions taken by the Jatinangor

Emergency Response Community (Jersey) at the pre-disaster, during disaster, and post-disaster stages. Pre-disaster activities include prevention, mitigation, early warning and make efforts to prevent flood disasters such as community service cleaning the environment and garbage that clogs river channels. Activities during a disaster include emergency response activities to relieve the affected victims, distribution of aid, evacuation, and search and rescue. Post-disaster activities are encouraging the community to clean the environment from flood debris such as garbage and scattered mud (Fedryansyah et al., 2018).

There is a role from the surrounding community in disaster management efforts through awareness of the dangers of flooding by creating a community organization called the Indonesian Volunteer Community. This community organization received assistance in the form of facilities and infrastructure from the private sector in the form of the establishment of a post and evacuation equipment. MRI provides the public with information about the status of the altitude so that the community can immediately prepare for the flood disaster. In addition, the community has done self-help to patch the cracked and leaking embankments (Muhammad and Yaya, 2020).

Based on the results of previous research, if it rains heavily, the activities of local residents are disrupted if the rain falls beyond the capacity of the river, the local residents are prepared to move valuables to be moved to a higher place. Residents who usually work every morning to go to work have to wade through the water that flows into their homes. Not to mention, the sewers are clogged due to the large amount of garbage that prevents the water from flowing and clogged causing the water to overflow and this unwanted thing happened, most of the school children were also constrained because of the flood. This incident might not have happened if residents in RT 2 RW 3 Kelurahan Sungai Lakam Timur worked together to clean up ditches and rivers that were previously blocked could flow as usual (Razalo and Dewy, 2020).

This helps the community in forming and planning what actions need to be taken during a flood. Community participation must be carried out in an organized and coordinated manner so that it can be carried out effectively. A community organization should be formed to take early actions and regulate community participation in flood problems. This is done to increase public knowledge in dealing with flooding while reducing its impact (Razalo and Dewy, 2020).

## E. CONCLUSIONS AND SUGGESTIONS

### 2 CONCLUSION

The results of this study stated that as many as 13 respondents (43.3%) of the community had less knowledge of clean water management and as many as 17 respondents (56.7%) of the community had good knowledge of clean water treatment. The results of statistical test analysis in this study found that:

- a. Fisher exact test results show that  $\chi^2$  value = 0.004. Based on the p-value in the statistical test results, it was concluded that  $H_0$  was rejected ( $p < 0.05$ ), which means that there is a relationship between gender and flood prevention activities.
- b. Fisher exact test results show that p-value = 0.229. Based on the p-value in the statistical test results, it was concluded that  $H_0$  was accepted ( $p \geq 0.05$ ), which means that there is no relationship between flood prevention activities and knowledge of clean water management.
- c. Fisher exact test results show that  $\chi^2$  p-value = 0.005. Based on the p-value in the statistical test results, it was concluded that  $H_0$  was rejected ( $p < 0.05$ ), which means that there is a relationship between flood prevention activities and community institutions that play a role in flood prevention.
- d. Fisher exact test results show that p-value = 0.637. Based on the p-value in the statistical test results, it was concluded that  $H_0$  was rejected ( $p \geq 0.05$ ), which means that there is no relationship between flood prevention activities and the potential of natural resources in flood prevention.

### 2. SUGGESTION

- a. The need to increase knowledge about clean water management in the community to kill bacteria and to remove chemicals in water, especially clean water treatment during flood disasters in Banjar Regency
- b. The need for flood prevention efforts by providing information related to disaster management with clean water management for local communities in Banjar Regency
- c. The need to know natural resources in efforts to manage clean water in the people of Banjar Regency

- d. The need for the establishment of institutions that are responsible for preventing floods and environmental-based diseases in Banjar Regency

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