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ANALYSIS OF STUDENTS' PREPAREDNESS IN PUBLIC AND PRIVATE HIGH SCHOOLS STUDENTS FOR LANDSLIDE DISASTER RISK IN MAJA DISTRICT

Arie Ramadhan Pribudianto[1], Enok Maryani[2], Darsiharjo[3]
[1,2,3]Geography Education Study Program, Universitas Pendidikan Indonesia
[1]arieramadhanpr@upi.edu, [2]enokmaryani@upi.edu, [3]darsiharjo@upi.edu

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ABSTRACT

Disasters are the result of natural and social processes; efforts to reduce disaster risk can be done by changing human behavior and increasing awareness and concern for the environment. The purpose of this study was to find out how big the risk of landslides is in Maja District and to see the level of preparedness of public and private high school students in facing the risk of landslides. The survey research method is related to the presence of high cases of landslides; according to BPBD Majalengka Regency, in 2017, Maja District had 7 cases. Data collection for the level of disaster risk was weighted using the formula from Puslittanak Bogor (2004), and then a map of the level of landslide vulnerability was made from the results of the overlay of the five parameter maps with ArcGIS. Data on student preparedness was obtained using a questionnaire at school, and then the two samples were analyzed using descriptive analysis. Based on the research results, it is known that Maja District has a high potential for landslides, with a score of 70.8. For the level of preparedness of students after testing with SPSS, a comparison of the level of preparedness of public and private high school students with the T-test obtained the results of -2.496 (t-count) and -2.521 (t-table). Because the t count is greater than the t table, there is a difference between public and private high schools. So socialization regarding disasters must be increased in all high schools in Maja District.
Keywords*: Student Preparedness, Disaster Risk, Maja District*

INTRODUCTION

Disasters are the result of natural and social processes, the natural condition of an area has the potential for danger, and it can appear as a natural disaster (Setyowati, 2019). Human behavior is an important factor in increasing vulnerability and as a trigger for disasters. Efforts to minimize disaster risk can be done by changing human behavior. Changing human behavior can be done by changing the mindset and considering yourself from an early age to always care about the environment and be aware of disasters. (Pramono, 2016). Through disaster education, it is hoped that it will be able to increase disaster knowledge and change attitudes and behavior to always be aware of disasters.

One of the natural disasters that has a large impact is landslides. Landslide disasters are natural disasters that often occur in Indonesia, especially in Java, which has a very high frequency of landslide events and increases almost every year, triggered by topographical conditions combined with rainfall (Pratiwi et al., 2021). West Java is one of the provinces that has the highest level of landslide disaster risk compared to other provinces in Indonesia. Areas located in the center and south of West Java have a high level of vulnerability to landslides, which include

the regencies of Garut, Majalengka, Kuningan, and many more (Naryanto, 2011). Based on data from the National Disaster Management Agency (BNPB) in 2018, West Java was ranked 3 (three) provinces with 338 natural disaster events, East Java with 451 incidents, and Central Java with 578 incidents (Nugroho et al., 2018) as can be seen from the following data in figure 1.

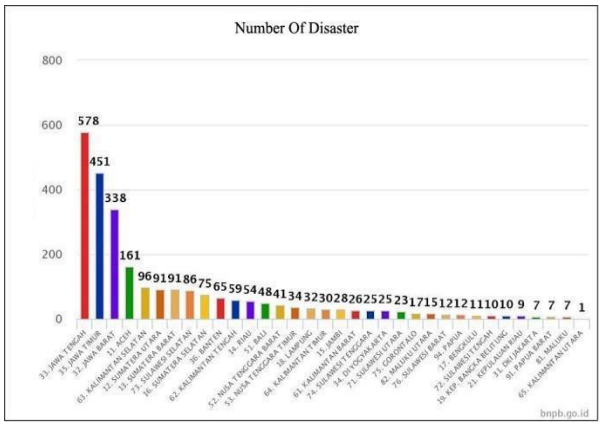

Figure 1. Number of Disasters

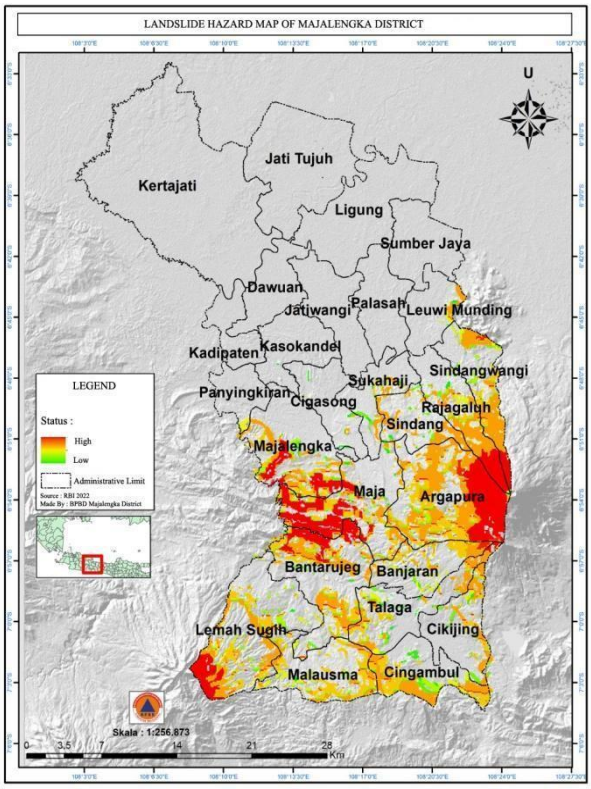

Figure 2. Landslide Hazard Map

Preparedness and knowledge of disaster risk are still low. We still often ignore the aspect of disaster risk in our daily lives (Erlia et al., 2017). Some of the problems in the process of implementing disaster management are the lack of optimal participation and coordination of stakeholders and a very low level of preparedness and knowledge of disaster risk (Arsyad, 2017)

Maja District, which is in Majalengka District, is one of the areas that have a high risk of landslides, which can pose a hazard if the community and students around the area have low disaster preparedness and knowledge (Jerison Sumual & Technical, 2022). Based on the characteristics of the Maja District area, it shows that it has a potential risk of landslides. This is a consequence of the condition of the Maja District area both geologically, geomorphologically, and climatically which has the potential to experience landslides (Sukma, 2021). Can be seen from the map made by the Disaster Management of Majalengka Regency (BPBD) 2022, it can be explained that several areas in Majalengka Regency are at risk of landslides in Figure 2.

Student preparedness as part of disaster mitigation needs to be measured to analyze the extent to which students are prepared for the risk of an impending disaster. Knowledge and a sense of preparedness regarding a disaster will certainly be greatly supported by disaster literacy received or taught at school (Marlyono et al., 2016). Preparedness is not only for the community; in this case, it is more specifically for the category of students regarding how to deal with disasters by providing learning in schools (Ayub et al., 2020). According to Law Number 24 of 2007 concerning Disaster Management, given the large potential for landslides, local governments (provinces, districts, and cities) must implement disaster mitigation processes optimally (Dewina Nasution, SH., 2007).

The objectives of this study can be described in several points, namely: (1) to analyze the level of risk of landslides in Maja District (2) To analyze the level of preparedness of students in facing the risk of landslides in Maja District. and (3) comparing the level of preparedness of public and private high school students in Maja District.

RESEARCH METHOD

The method used by researchers is a survey research method with risk descriptive analysis because it is related to the level of landslides and the preparedness of high school students in the Maja District. Data collection on the risk level of landslides uses the formula from Puslittanak Bogor (2004) as follows:

N Max- N Min/5

N Max = High Score
N Min = Low Score
5 = Landslide Parameter

Data collection on the level of preparedness of students was carried out using a questionnaire, with the population in this study being all high school students in Maja District, which is a landslide-prone location. The following are the names of the schools that will be sampled in Table 1.

Table 1. Total High School population in Maja District

No	School Name	Total of Student
1	SMAN 1 MAJA	326
2	MA 1 PUI MAJA	116
3	MA Assalam MAJA	43
Total		485

Source: Data Analysis(2022)

Sampling using the Simple Random Sampling technique is aimed at taking the population, so that every high school in Maja District, this study uses the Slovin formula with the following calculation method:

$$n = \frac{N}{1 + (Ne)2}$$

Information:

n = Number of Samples Wanted
N = Population Size
e^2 = Applied Precision (based on the confidence value in this research of 5% (0.05)

The total population of SMA in Maja District is 485 students, so the sample calculation is:

$$n = \frac{485}{1 + 485\ (0{,}05)\ 2}$$

$$n = \frac{485}{2.21}$$

n = 219.45 rounded so (220 people)

RESULTS AND DISCUSSION

1. The level of disaster risk in the District of Maja

Maja District is one of the areas in Majalengka Regency, the area has a hilly topography and according to BPS data for Majalengka Regency 2021, in the recapitulation of disaster events per month in Majalengka Regency in 2021, landslides are the most frequent disaster events compared to other disasters in one year, such as floods with 73 incidents in second place, extreme weather with 41 incidents in third, and fourth position there are ground movements with 20 disaster events, while landslides are in the first position with the most disaster events with 92 incidents in various areas in Majalengka Regency in 2021 (Sukma, 2021). Landslide disasters occur within 5 months from November – March, because these months are months that have high rain intensity besides landslides, erosion, and floods can also coincide with landslides because they are influenced by rain intensity in Majalengka Regency. Meanwhile, the month that experienced the most landslides was February with 25 incidents (Agung, 2013).

After seeing several cases of landslides that occurred in Majalengka Regency, especially in Maja District, we use ArcGIS which is a compilation of functions from various Geographic Information System software (Al Fauzi R et al., 2022). The researchers overlaid the map with the help of weighted overlay tools on ArcGIS and also scored using the method from the Bogor Research Center Puslittannak Bogor, 2004, according to (Rahmad et al., 2018) were 5 parameters to determine the level of landslide risk, namely land use, slope, rock type, rainfall, and soil type. To see how big the risk of landslides is in the Maja sub-district, the results can be described as follows.

Parameters of Landslide Disaster Vulnerability in Maja District

There are five avalanche parameters that researchers analyze using a Likert scale :

1) Land Use

Parameters of land use in Maja District are divided into five categories, namely shrubs, fields/moor fields, mixed gardens,

paddy fields, and settlements areas. The results of the analysis of the land use map shows that most of the Maja District has a percentage of 40% being rice fields and gets a score of 4.

2) Slope Slope

The slope parameters in Maja District are divided into five vulnerability classes, namely very high with a score of 5 and criteria for slope above 40%. And not dangerous with the criteria of a slope below 8%. After analysis, it is known that the slope in Maja District has a percentage of 25%-45% and gets a score of 4.

3) Rock Type (Geology)

Rock type parameters (geology) in Maja District are divided into five vulnerability classes, namely alluvial plains, limestone hills, granite hills, sedimentary hills, and basalt-clay shale hills. Judging from the map image, it can be seen that the type of geology in Maja District, namely granite, has a score of 4 because it is located in sedimentary hills.

4) Rainfall

The results of the analysis of all areas in Maja District are included in the coverage area with high rainfall intensity in the range of 3000-4000 mm per year. The researchers gave a score of 5 for the rainfall parameter in Maja District because the rain intensity is above 3000mm.

5) Type of Soil

Parameters The soil type in Maja District is divided into five vulnerability classes, the results of the analysis of all areas in Maja District are included in the coverage area that has Andosol and brown latosol soil types and gets a score of 4 because the soil type in Maja District contains a lot of Andosol.

The Results of Determining the Weight of Each Parameter for Landslide Hazard in Maja District

The first step that must be done is to calculate each weight using the scoring system and regional zoning, using calculations from Puslittanak Bogor 2004 (Rahmad et al., 2018). Then the next step is to overlay the five parameter maps using ArcGIS software with the assumption of equivalent weights for each parameter so that a landslide disaster risk level map is produced. For more details, see Table 2.

Table 2. Parameter of Landslide Disaster Vulnerability in Maja District

No	Map Parameters	Weight Parameter	Maximum Value	Minimal Value
1	Use of land	4	5	1
2	Toughened	4	5	1
3	Geology	4	5	1
4	Rainfall	5	5	1
5	Types of land	4	5	1
	Total	21	5	1

Source: Data Analysis (2022)

After determining the weight of each parameter, the next thing to do is determine the value of the interval by entering the value of the parameter weight for the level of vulnerability to landslides that have been previously analyzed by the researcher, and determining the value using the interval formula as follows:

N Max - N Min/5

75-21/5 = 70.8 (Interval Value)

After doing the calculation, the interval value of the landslide vulnerability parameter is 70.8. The next step after knowing the interval value is to determine the level of vulnerability to landslides with criteria that have been made by researchers with various sources, more details can be seen in Table 3.

Table 3. Vulnerability level criteria

No	Criteria	Description
1	15-34	Less Vulnerable to Landslide
2	35-54	Somewhat prone
3	55-74	Landslide Prone
4	>75	Very Vulnerable to Landslide

Source: Data Analysis (2022)

There are several criteria in determining the level of vulnerability to landslides, in determining these criteria it is divided into four levels from the lowest with less prone to landslides with criteria 15-34 and the highest very prone to landslides having a value above 75. And after being analyzed by researchers from landslide parameters that have been made, the resulting interval value is 70.8 and is included in the criteria (Landslide Prone).

Landslide Vulnerability Level in Maja District

After the researchers analyzed the level of vulnerability to landslides in Maja District, using the parameters forming the landslide disaster (Hardiyatmo, 2019), the resulting landslide vulnerability level interval value was 70.8 and entered into the landslide Prone criteria. For more details, see Figure 3.

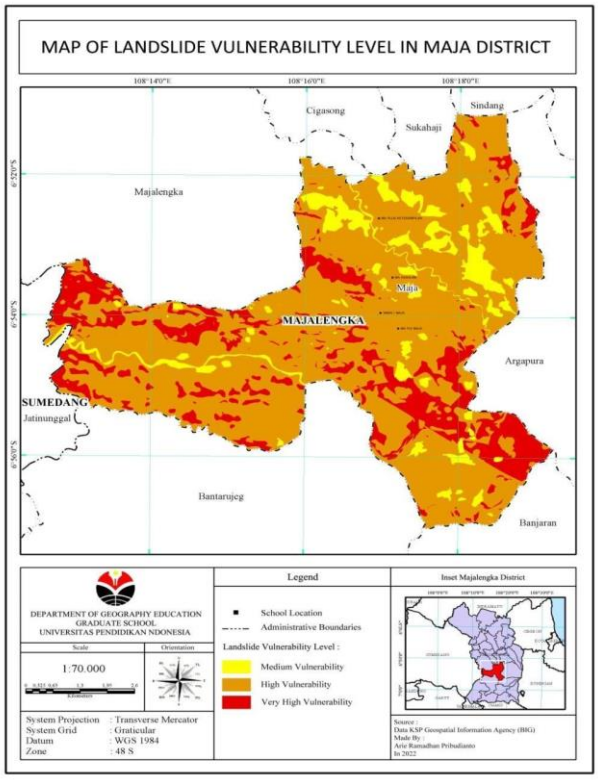

Figure 3. Map of Landslide Vulnerability

Based on the landslide vulnerability level map that has been made by researchers using ArcGIS, it is found that the level of landslide vulnerability in Maja District is divided into three criteria, medium, high, and very high vulnerability, this is due to the Maja District area being at an altitude of between 400-600 meters above sea level and does not have areas of low landslide susceptibility. The landslide vulnerability level map is obtained from the overlay of five parameter maps making up the landslide disaster using the calculated weight of the scoring method which is divided into four hazard classes, namely Highly Landslide Prone, Landslide Prone, Somewhat Landslide Prone, Less Landslide Prone (Invanni, 2014). Meanwhile, the locations of the schools used as research sites were in several areas, such as SMA 1 Maja and MA PUI Maja in South Maja Village and MA Assalam in Cipicung Village which are in areas of high vulnerability criteria. According to BPS Majalengka Regency 2022, the Maja sub-district has a high rainfall rate, which is between 3000-4000 mm/year, so it is very influential on landslides and rock types at the study site is an area with rock structures that are strongly (Aep Saepudin, Imam Abdurohman, 2022). Besides that, it is also influenced by the condition of the hills and Mount Ciremai which is close to the location.

2. The Level of Preparedness of Students in Facing the Risk of Landslides in Maja District

Preparedness is a part of the disaster management process, and in the current concept of disaster management, increased preparedness is an important element of proactive disaster risk reduction activities. Before a disaster occurs. (United Nations, 2007). One way to reduce disaster risk is by building a permanent and integrative disaster reduction culture can be done through education. Educational efforts aim to change one's behavior (Ilmiah et al., 2022). Disaster education seeks to enhance protective measures, by providing information about the hazards and risks they pose. If planned effectively and implemented properly, eventually, people will become familiar with safety practices in all forms of disaster-related actions. Schools are one of the institutions that have a strategic position and play an important role in efforts to prevent disasters and mitigate them. This is because schools can provide information, knowledge, and skills to the entire school community and society effectively. Information and knowledge obtained by individuals through schools can increase knowledge and behavioral skills in dealing with disasters (Salwa Salsabila & Rafa Dinda, 2021). Seeing the importance of schools in efforts to increase disaster preparedness is also strengthened by the Law of the Republic of Indonesia no. 24 of 2007 concerning disaster management emphasizes that disaster management must be integrated into development programs, including in the education sector. Children also need to have knowledge and skills regarding disaster

preparedness because, first, children are the next generation, and preparing them to be aware of disasters from an early age means saving our future. Second, children are generally classified as a vulnerable group (Arinata et al., 2022). By strengthening these vulnerable groups, it is hoped that they can act appropriately, not only saving their lives but also their families and those closest to them.

After analyzing using SPSS, the researcher then continued to carry out the scoring method to see the level of preparedness of students in Maja District, based on the general readiness index value, the criteria for preparedness attitudes can be grouped into 4 (four) levels, namely 0-25 is very low and the highest level is 75-100 with very high information, with data obtained from the field the researchers made scoring adjustments to produce data as in table 4.

Table 4. Scoring of Student Preparedness Level in Maja District

No	Range	Description
1	0-33	Very Low
2	34-67	Low
3	68-101	Currently
4	102-135	Tall
5	136-169	Very High

Source: Data Analysis (2022)

To find the level of preparedness of SMA/MA students in Maja District, the researcher has determined a score with the smallest range, namely 0-33, with very low information, and the highest range, namely 136-169, after being analyzed with data received from the field, the resulting value the level of preparedness of students as like in table 5.

Table 5. Level of Student Preparedness in Facing Disasters

No.	School Type	Mean	Category
1	Private	112,8472	High
2	Public	117,8784	High

Source: Data Analysis (2022)

After conducting the analysis, it was obtained the results of the level of preparedness of high school/MA students in Maja District, the table results and calculations stated that the level of preparedness of public and private high school students in dealing with landslides had a pretty good score, with public high schools for high school students in dealing with landslides has an average score of 117.8784 and is included in the high category, while Private High School has an average score of 112.8472 and is included in the high category/ the conclusion is, it means that public and private SMA students in Maja District ready in the face of landslides because it has a high level of preparedness category.

3. Differences in the Level of Preparedness of Public and Private High School Students Facing the Risk of Landslides in Maja District

By having disaster preparedness, it is hoped that everyone will be able to reduce threats and vulnerabilities when facing disasters through recognizing and monitoring disaster risk, participating in disaster management planning, developing a disaster awareness culture, increasing commitment to disaster management actors, implementing physical and non-physical efforts, and making disaster management arrangements (Havwina et al., 2017). Disaster preparedness Education in schools is defined as practical thoughts and efforts to reduce or eliminate all forms of disaster risk by prioritizing and/or prioritizing learning processes or other educational activities so that students can actively develop a culture of preparedness in facing the threat of danger from a disaster (Beatrix Hayudityas, 2020).

To show the results of the analysis of differences in the level of preparedness of public and private SMA/MA students in dealing with landslides, we can start with the following table of general descriptions of a sample of schools in Maja District in Table 6.

Table 6. General Description of the Sample of Schools in the District of Maja

	School Type	N	Mean	Std, Deviation	Std, Error Mean
Value of Preparedness	Private	72	112,8472	14,15872	1,66862
	Public	148	117,8784	13,76029	1,13109

Source: Data Analysis (2022)

From the output results, a general description is obtained, the average value for private high schools is 112.8472 while for public high schools, it is 117.8784, for the data distribution for private high schools it is 14.15 while for public high schools, it is 13.760.

To see these differences, the researchers collected data and conducted tests. After testing, a comparison of the level of preparedness of public and private SMA/MA students in dealing with landslides in Maja District using the method (T-Test) turned out to have differences. However, this difference is not too significant and is considered reasonable, for more details it can be seen in Table 7.

Table 7. Comparison of Preparedness Levels of Public and Private High School Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig,	t	df	Sig, (2-tailed)	Mean Difference	Std, Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Value of Preparad-ness	Equal variances assumed	.037	.848	-2.521	218	.012	-5.03116	1.99599	-8.96506	-1.09726
	Equal variances not assumed			-2.496	137.243	.014	-5.03116	2.01585	-9.01730	-1.04501

Source: Data Analysis (2022)

After the researchers conducted the test using SPSS Software, a comparison of the preparedness levels of public and private high school students in dealing with disasters after the T-test was carried out, the results are as follows. -2.496 (t-count) and -2.521 (t table). Because the t count is greater than the t table, there is a significant difference between the levels of preparedness. Then it was also clarified that from the output results above, a sig value (2 -tailed for testing) was obtained of 0.014, a significance value of <0.05, so it can be stated that there is a difference in the level of disaster preparedness between public high schools and private high schools in Maja District. There is a difference in the level of preparedness between the two types of schools because in terms of parameters, the two elements of the school are located in areas that have a high risk of landslides so there is a need for preparedness, therefore the two types of schools have special policies for their schools, especially in reducing disaster risk in particular landslide disaster. Differences are normal because each school has its policies (Martono et al., 2020). From the results of the analysis and field findings, the researcher found that socialization in schools was very useful for increasing students' preparedness for disasters. The influence of socialization on increasing preparedness is supported by findings (Inayah, 2019) that the level of preparedness of students has increased after being given socialization. Apart from that, the efforts made by state schools to improve the subjects they teach, such as physics subjects with wave material. In addition, public schools utilize geography teachers to socialize disaster preparedness in

class. Coincidentally, in the public SMA/MA in Maja District, geography subjects are included in elective subjects in social studies and science classes to further develop knowledge about disasters. Based on the findings of researchers in the field found whereas, in private schools, existing policies in schools began to experience relaxation, because private schools in the regions did not have an extra budget to add disaster facilities, different from the private school in big cities that have good facilities, private schools in areas such as in Maja District only had simple facilities, therefore there was a relaxation in efforts to reduce disaster risk through several school actions have not been carried out optimally.

Data in the field shows that the preparedness of public and private high school students does have differences, but the scores are only slightly different. This is illustrated by the scores held by public and private SMA/MA after the T-Test.

Based on the previous explanation, it can be concluded that there are differences in disaster preparedness between public and private high school students. However, the scores are not too different, with public schools having an average score of 117.8784 and private schools of 112.847 and both scores are in the high category. While the results (T-Test) yield -2.496 (t count), and private -2.521 (t table). There is no significant difference between the preparedness of public and private SMA/MA students in the Maja District due to the regular socialization of disaster preparedness. The results of this analysis were also confirmed by the principals of the three schools that periodic disaster socialization was often held by teachers and BPBD because they saw the vulnerability of disasters in the Majalengka Regency.

CONCLUSIONS

After scoring quoted from Puslittanak Bogor (2004) and making maps using ArcGIS it is clear that overall the Maja District area has a high risk of landslides with a score of 70.8 so researchers are valid to conduct research in landslide-prone areas to see the preparedness of public and private high school students.

There are differences in the level of preparedness of public and private SMA/MA students, with scores that are not too large and fall into the ready category with an average score for Public SMA of 117.8784 and Private SMA of 112.8472.

The similarity of the lack of disaster facilities in public and private schools is due to a lack of budget for disaster facilities which can pose disaster risks that can threaten the lives of students in schools.

RECOMMENDATIONS

Socialization regarding disasters must be further enhanced to be able to increase the preparedness of SMA/MA students and the general public in dealing with landslides in the Maja District. Information media regarding disasters based on findings in the field must be augmented, especially for areas prone to landslides such as Maja District.

For other researchers who will be researching disaster preparedness in Majalengka Regency, especially Maja District, the research must be more focused in more detail on which areas are truly prone to disasters so that the results of their research can be sharper and more focused.

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