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Evaluation of the Role of RTRW (*Rencana Tata Ruang Wilayah*) in Creating a Tourism Area Resilient To Landslide Disaster (Case Study: Petungkriyono District)

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ABSTRACT

Pekalongan Regency is one of the areas that has the potential for landslides. The vulnerability to this disaster has an impact on the utilization of existing space, one of which is the tourist area. However, spatial planning for tourist areas in Pekalongan Regency in the form of tourist objects located in other spatial pattern allocations (in this case not the spatial pattern of the tourism area) and this tourist area is located in an area prone to landslides. This study will evaluate the role of the *RTRW* in creating a landslide-resilient tourist area in Petungkriyono District using the process evaluation analysis method (process of public policy implementation). This study contributes to input on policies, especially on the *RTRW* regarding zoning and requirements for disaster mitigation in tourist areas that have never been discussed in previous research. The first stage is to analyze the level of landslide vulnerability using scoring and weighting techniques to then conduct an overlay analysis of the variables used. The second stage is the analysis of the evaluation of the role of the *RTRW* carried out by looking at 3 (three) aspects including the evaluation of the synchronization of Policies and Implementation of Zoning Regulations and the evaluation of Program Implementation in the Pekalongan Regency *RTRW*. The results of the landslide vulnerability level in tourist areas in Petungkriyono District range from high to very high. The Pekalongan Regency *RTRW* itself is a policy that focuses on spatial planning, so the evaluation in this case is the disaster management policy in the spatial *RTRW*. The results of the study stated that the role of the *RTRW* is quite good, which means that the *RTRW* has played a very important role in creating a disaster-resilient tourist area in Petungkriyono District. However, it has not detailed the provisions based on the level of disaster risk classification, especially for high and very high disaster risks which will have an impact on controlling development in the area. In this case, disaster mitigation arrangements in landslide-prone tourist areas need to be detailed in relation to building density, green open spaces, and requirements for tourist activities. In addition, disaster mitigation efforts can be added in tourist areas by considering the level of disaster risk.

Keywords: policy evaluation, landslides, spatial planning, pekalongan

ABSTRAK

Kabupaten Pekalongan merupakan salah satu wilayah yang memiliki potensi bencana tanah longsor. Adanya kerawanan bencana ini berdampak pada pemanfaatan ruang yang ada, salah satunya adalah kawasan wisata. Namun, perencanaan ruang terhadap kawasan wisata di Kabupaten Pekalongan berupa obyek wisata yang berada pada peruntukan pola ruang lainnya (dalam hal ini bukan pola ruang kawasan pariwisata) serta kawasan wisata ini berada pada kawasan rawan bencana tanah longsor. Studi ini akan mengevaluasi peran RTRW dalam menciptakan kawasan wisata tangguh bencana longsor pada Kecamatan Petungkriyono dengan menggunakan metode analisis evaluasi proses (process of public policy implementation). Studi ini memberikan kontribusi terhadap adanya masukan terhadap kebijakan khususnya pada RTRW tentang zonasi dan syarat untuk mitigasi bencana pada kawasan wisata yang belum pernah dibahas pada penelitian sebelumnya. Tahap pertama adalah menganalisis tingkat kerawanan longsor menggunakan teknik pemberian skor dan pembobotan untuk kemudian dilakukan analisis overlay terhadap variabel yang digunakan. Tahap kedua adalah analisis evaluasi peran RTRW dilakukan dengan melihat 3 (tiga) aspek meliputi evaluasi sinkronisasi Kebijakan dan Implementasi Pengaturan Zonasi serta evaluasi Pelaksanaan Program Pada RTRW Kabupaten Pekalongan. Hasil Tingkat kerawanan longsor pada daerah wisata di Kecamatan Petungkriyono mulai dari tinggi sampai sangat tinggi. RTRW Kabupaten Pekalongan sendiri merupakan kebijakan yang berfokus pada tata ruang, sehingga evaluasi dalam hal ini adalah kebijakan penanggulangan bencana pada RTRW yang bersifat spasial. Hasil studi

menyatakan bahwa peran RTRW cukup baik yang berarti RTRW sudah sangat berperan dalam menciptakan kawasan wisata tangguh bencana pada Kecamatan Petungkriyono. Namun belum merinci ketentuan berdasarkan tingkat klasifikasi risiko bencananya terutama pada risiko bencana tinggi dan sangat tinggi yang akan berdampak pada pengendalian pengembangan pembangunan di kawasan tersebut. Pada kasus ini, pengaturan mitigasi bencana pada kawasan wisata rawan longsor perlu dirinci terkait dengan kepadatan bangunan, ruang terbuka hijau, dan persyaratan untuk aktivitas wisata. Selain itu, dapat ditambahkan upaya mitigasi bencana di kawasan wisata dengan mempertimbangkan tingkat risiko bencananya.
Kata kunci: *evaluasi kebijakan, longsor, rencana tata ruang, pekalongan*

1. INTRODUCTION

Pekalongan Regency is an area whose topography is predominantly in the 0-8% range with an area of 32,791.96 Ha whose distribution is in the northern part of Pekalongan Regency. Slopes ranging from 15-25%, 25-45% and >45% with a classification of slightly steep to very steep are spread across the southern part of Pekalongan Regency which has a hilly morphology. The differences in topographic classification have an impact on differences in disaster vulnerability. In flat areas, disasters occur in the form of tornadoes and drought. In areas with steep topography, the disaster that occurs is landslides. In contrast to tornado and drought disasters, this landslide disaster is one of the disasters that needs to be anticipated because it occurs in areas with steep topography, and makes the evacuation process difficult, so arrangements regarding space utilization need to be carried out safely and effectively.

Landslides (land mass movements) are the result of mass movements along critical landslide planes (slide planes). The definition of mass movement is the movement of masses of rock, regolith and soil from higher places to lower places because they are influenced by the force of gravity (Priyono, 2015). Meanwhile, according to Susanti et al (2017), landslides are hydrometeorological disasters, namely disasters caused by climate and weather changes. Landslide vulnerability occurs in areas with conditions such as steep slopes; there is a sliding (watertight) surface in the subsurface layer of the soil; and there is groundwater above the water-saturated impermeable layer (Paimin et al., 2009)

The southern area of Pekalongan Regency, which has steep topography, is currently being developed as a tourist area. The characteristics of the area with views of hills and mountains are one of the stunning attractions for visitors from the Pekalongan Regency area and outside the region. Based on data from the Pekalongan Regency Regional Spatial Plan, there are at least 24 (twenty-four) natural and cultural tourist destinations located on steep topography. The development of tourist areas located on steep topography certainly needs to limit the use of space through regulations. This is in anticipation of land developments that may occur and can increase the risk of landslides.

Ramadhan & Kurniawan (2021) have conducted research on Evaluation of Regional Spatial Planning Development Against Landslide Disasters in Cisarua District, Bogor Regency, where in this research describes an overlay analysis between residential spatial pattern plans and landslide susceptibility maps. Furthermore, research conducted by Putra & Matsuyuki (2019) looked at the role of local sector institutions in disaster management, especially after decentralization through a review of policies and regulations. The implementation of policies and regulations by stakeholders in disaster management also needs to be improved, especially by formulating regulations and outreach carried out by relevant stakeholders. This is done to minimize the number of losses and casualties due to the impact of disasters (Asmungi, 2019).

In contrast to the research conducted by Ramadhan & Kurniawan (2021) which describes the analysis techniques for evaluating landslide-prone areas, as well as the research by Putra & Matsuyuki (2019) which highlights the role of institutions in regulation, this research will discuss the provisions in the *RTRW* policy regarding zoning of tourist areas that are prone to landslide disasters. The method used in this study is quantitative by looking at spatial analysis of landslide susceptibility variables. The results of this analysis will then be compared with the *RTRW* spatial pattern plan and analysed descriptively to see the extent of the role of the Pekalongan Regency *RTRW* in mitigating disasters, especially in the Black Canyon tourist area. Further anticipatory steps in the form of regulations will also be discussed, especially in tourist areas to limit and regulate the development of space utilization. The benefit of this study is that it can provide input to the Pekalongan Regency Government to formulate further regulations if the *RTRW* role is deemed not to be optimal and applicable enough. This is done to anticipate negative impacts that might occur in tourist areas affected by landslides.

2. METHOD

This research uses quantitative methods using weighting and a Geographic Information System. The weighting technique uses overlay analysis of the variables used. Different parameters or criteria influence the landslide vulnerability, identifying these parameters is the primary step in the analysis which are Geology, Geomorphology, Lithology,

Elevation, Slope, Lineament, Rainfall, Land Use and Land Cover, and Soil (Bose et al., 2025). Using the intersect feature in Arcmap GIS 10.3 software is useful for combining spatial attributes with the variables used, then the next step is to get results in the form of a landslide hazard map in Petungkriyono District, and more specifically in tourist areas. In the final stage, an evaluation process was carried out on the *Rencana Tata Ruang Wilayah (RTRW)* in Pekalongan Regency.

The data in this research was obtained from secondary data through related agencies, except for data on tourist conditions obtained through field observations. Variable data used to analyze landslide hazards is accessed from recording institutions and agencies, relevant journals and official agency websites, both tabular data in the form of tables and spatial data for GIS analysis. The scoring and weighting in this research refers to parameters according to the model for estimating landslide-prone areas by the Direktorat Vulkanologi dan Mitigasi Bencana Geologi/DVMBG (2004), namely:

Score = (30%×FCH)+(20%×FG)+(20%×FJT)+(15%×FKL)+(15%×FPL)……...1

Keterangan:

FCH = Rainfall Factor

FG = Geological Factors

FJT = Soil Type Class Factor

FKL = Slope Class Factor

FPL = Land Use Factors

Table 1. *Weighting and Scoring of each Parameter According to the Ministry of Energy and Mineral Resources' DVMBG*

Parameter	Unit	Score	Value
Topography	3-8%	1	15%
	8-15%	2	
	15-25%	3	
	25-40%	4	
	>40%	5	
Land Use	Fields/Drylands	3	15%
	Sand/Gravel	4	
	Settlements	4	
	Shrubs/Brushes	2	
	Forests	1	
	Mangrove Forests	1	
	Ponds/Fishponds	1	
	Clouds	1	
	Gardens/Plantations	3	
	Rice Fields	3	
	Rainfed Rice Fields	3	
	Water Bodies	1	
Soil Type	Alluvial	1	20%
	Litosol	2	
	Grumosol	3	
	Mediteran	4	
Rainfall	3225-3382	1	30%
	3382-3564	2	
	3564-3719	3	
	3719-3871	4	
Types of Rocks	Alluvium	1	30%

Parameter	Unit	Score	Value
	Andesite	2	
	Sandstone, silt, shale	3	
	Quartzite	3	
	Limestone	1	
	Peridotite	1	
	Conglomerate	3	
	Tefra	1	

Source : Direktorat Vulkanologi dan Mitigasi Bencana Geologi/DVMBG (2004)

The type of policy evaluation that will be used in this research is the process of public policy implementation, which is evaluation research that is based on implementation instructions and technical instructions and the measure of success is the conformity of the implementation process with the guidelines (guide lines) that have been set. The instructions that will be used as a basis are Undang-Undang Republik Indonesia Nomor 24 Tahun 2007 Tentang Penanggulangan Bencana and Peraturan Daerah Kabupaten Pekalongan Nomor 1 Tahun 2016 Tentang Penyelenggaraan Penanggulangan Bencana. The policy that will be evaluated in this research is Peraturan Daerah (PERDA) Kabupaten Pekalongan Nomor 3 Tahun 2020 tentang Rencana Tata Ruang Wilayah Kabupaten Pekalongan Tahun 2020-2040 which focuses on tourism areas and regulations regarding disaster management.

3. RESULT AND DISCUSSIONS

3.1. Landslide Vulnerability and Tourist Attractions

Analysis of landslide susceptibility mapping is based on 5 (five) parameters including rainfall (30%), geology (20%), land use (15%), soil type (20%) and land slope (15%). Table 2 describes the data regarding the landslide susceptibility variable along with the scores for each variable. The most prominent parameter in Petungkriyono District is the slope slope, where in this area the slope ranges from 15% to > 45% which is included in the steep area.

The classification of landslide susceptibility according to the Directorate of Volcanology and Geological Disaster Mitigation/DVMBG (2004) is divided into four classes including low, medium, high and very high. The results of the analysis show that an area of 7,151.48 Ha or 85% of the total area has a very high level of landslide vulnerability, 14% or an area of 1,226.48 Ha is an area with a high level of vulnerability and the rest is an area with medium and very low vulnerability. This condition is in line with the topographic conditions in the study area, where most of the area is in steep areas.

In the next analysis, there is an analysis of tourist attractions with their level of landslide vulnerability. This analysis is a follow-up analysis to the previous analysis, by linking the

location of tourist attractions with the level of landslide vulnerability. Figure 1 is a map of landslide susceptibility along with the locations of tourist attractions in Petungkriyono District.

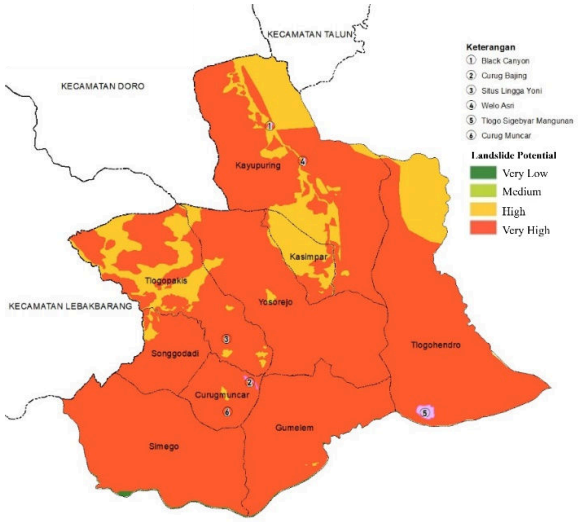

Figure 1. *Tourist Attractions and Landslide Vulnerability Levels in Petungkriyono District*
Source: Data Processing, 2024

There are 6 (six) tourist attractions in Petungkriyono District, all of which are in high to very high disaster-prone areas. This is related to the types of tourism available, all of which are natural tourism. Areas with steep topography usually have advantages in the form of natural conditions that can be developed as tourist areas. The increasing interest of tourists visiting natural tourist destinations has made people in mountainous areas explore the existing potential, one of which is tourism. The development of tourist areas, which in this case are located in areas with high and very high levels of landslide vulnerability, of course requires adequate regulations/policies so as not to cause losses if a disaster occurs. Table 1 shows tourist attractions and their level of landslide vulnerability in Petungkriyono District.

Table 1. Tourist Attractions and Landslide Vulnerability Levels in Petungkriyono District

Tourism	Landslide Category	Area (Hectare)
Black Canyon	Very High	0,393
	High	0,002
Curug Bajing	Very High	1,273
Curug Muncar	Very High	0,202
Situs Lingga Yoni	Very High	0,014
Tlogo Sigebyar Mangunan	Very High	13,121
Welo Asri	Very High	0,923
	High	0,214

Source: Data Processing, 2024

3.2. Spatial Pattern Plan at Tourist Attractions According to RTRW

Spatial pattern is the distribution of space allocation in an area which includes space allocation for protection functions and space allocation for cultivation functions. This spatial pattern plan was prepared based on analytical considerations that have been carried out, one of which is the analysis of regional functions. Analysis of the function of this area is the distribution of recommendations for the allocation of areas that can be developed as cultivation areas, buffer areas and protected areas. The designation of each area certainly has its own conditions and regulations so as not to cause negative impacts from social, economic or environmental aspects. Figure 2 is a map of the spatial pattern plan for Petungkriyono District based on the RTRW of Pekalongan Regency for 2020-2040 which is overlaid with tourist attractions.

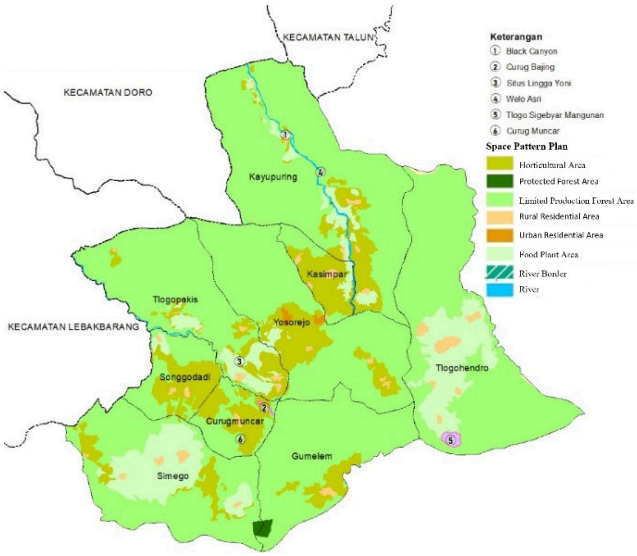

Figure 2. *Overlay of Petungkriyono District Space Pattern Plan and Tourist Attractions*
Source: Data Processing, 2024

Based on Peraturan Daerah Kabupaten Pekalongan Nomor 3 Tahun 2020 tentang Rencana Tata Ruang Wilayah Kabupaten Pekalongan Tahun 2020-2040, spatial pattern plans in tourist areas are divided into cultivation areas and protected areas. In the Pekalongan Regency RTRW, the development of tourist attractions is not mapped, it is only mentioned of the list of tourist attractions in Pekalongan Regency. This unmapped tourist attraction in Petungkriyono District means that the spatial pattern plan for the tourist attraction is a non-built area. Table 2 is a spatial pattern plan for tourist attractions in Petungkriyono District.

Table 2. *Spatial Pattern Plan at Petungkriyono District Tourist Attractions*

Tourism	Landslide Category	Space Pattern Plan	Area (Hectare)
Black Canyon	Very High	Food Plant Area	0,371
		River Border	0,022
	High	Limited Production Forest Area	0,002
		River	0,116
Curug Bajing	Very High	Horticultural Area	0,815
		Limited Production Forest Area	0,342
Curug Muncar	Very High	Limited Production Forest Area	0,202
Situs Lingga Yoni	Very High	Food Plant Area	0,014
Tlogo Sigebyar Mangunan	Very High	Limited Production Forest Area	13,121
		Food Plant Area	0,398
Welo Asri	Very High	Limited Production Forest Area	0,525
	High	River	0,214
Total			16,140

Source: Data Processing, 2024

3.3. Evaluation of the Role of RTRW in Creating Disaster Resilient Tourism Areas

The Pekalongan Regency Regional Spatial Plan is a general spatial planning plan for the district area, which contains objectives, policies, spatial planning strategies for the district region, spatial structure plans for the district region, spatial pattern plans for the district region, determination of strategic district areas, directions for the use of regional space district, and provisions for controlling the use of district space. Based on the Peraturan Menteri Agraria Dan Tata Ruang/ Kepala Badan Pertanahan Nasional Republik Indonesia Nomor 11 Tahun 2021 Tentang Tata Cara Penyusunan, Peninjauan Kembali, Revisi, Dan Penerbitan Persetujuan Substansi Rencana Tata Ruang Wilayah Provinsi, Kabupaten, Kota, Dan Rencana Detail Tata Ruang, preparing RTRW Districts have a total time period of 12 (twelve) months starting from the preparation stage to drafting the Draft Regional Regulation which involves government agencies, academics, institutions and the community.

The aim of spatial planning in the Pekalongan Regency RTRW is to create a productive regional space based on industry and agriculture supported by the trade and service sectors in an integrated and sustainable regional system. Evaluation of the spatial planning objectives can of course be seen in 2040 according to the policy timeframe, but evaluation of the process can be carried out from now on. Likewise with the arrangement of tourist areas in Petungkriyono District, where in the Pekalongan Regency RTRW it is only mentioned as "Petungkriyono tourist area". Tourist areas are activities that can trigger

land use development in the surrounding area, but if this tourist area is in a disaster-prone location then there must be special intervention or requirements that must be met.

An evaluation of Peraturan Daerah Kabupaten Pekalongan Nomor 3 Tahun 2020 tentang Rencana Tata Ruang Wilayah Kabupaten Pekalongan Tahun 2020-2040 was carried out by looking at the processes that had been carried out and conditions in the field. The existing arrangements and requirements in the RTRW regarding tourist areas and disaster-prone areas will be studied to analyze the role of the RTRW in creating disaster-resilient tourist areas. The guidelines that will be referred to in disaster management are Law of the Republic of Indonesia Number 24 of 2007 concerning Disaster Management (*Undang-Undang Republik Indonesia Nomor 24 Tahun 2007 Tentang Penanggulangan Bencana*) dan Pekalongan Regency Regional Regulation Number 1 of 2016 Concerning Implementation of Disaster Management (*Peraturan Daerah Kabupaten Pekalongan Nomor 1 Tahun 2016 Tentang Penyelenggaraan Penanggulangan Bencana*).

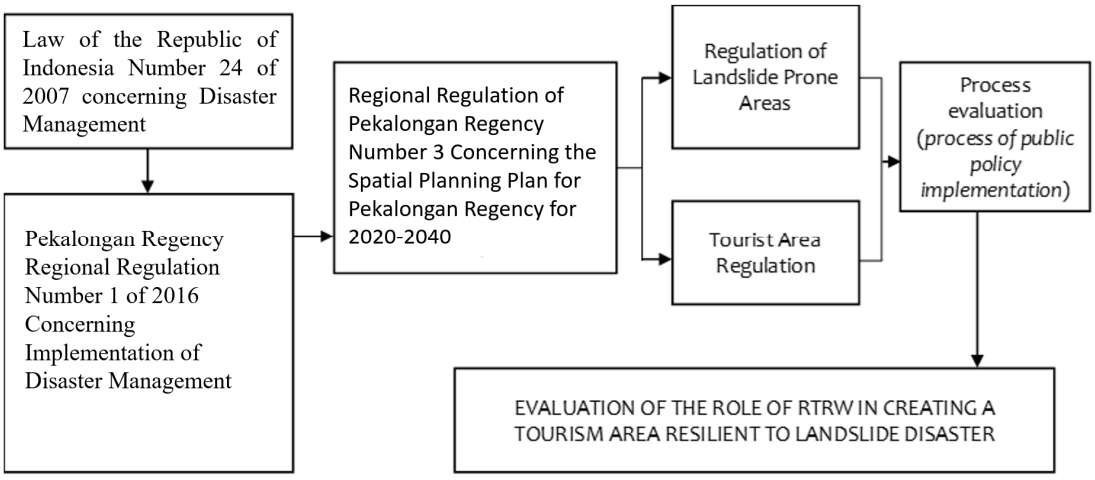

Figure 3. Policy Evaluation Framework

Evaluation of policies guided by this guideline will see the extent to which the role has been implemented. In the Regional Spatial Plan with a period of 20 years, it is divided into 4 (four) implementation stages, namely PJM 1 (2020-2024), PJM 2 (2025-2029), PJM 3 (2030-2034) and PJM 4 (2035- 2039). This evaluation of the RTRW will focus on looking at aspects of PJM 1, namely 2020-2024. Table 4 below is an evaluation of the RTRW which refers to the policy hierarchy starting from Laws to Regional Regulations.

a. Evaluation of Pekalongan Regency Disaster Management Policy Synchronization (Landslides)

Table 3 is a review of the existing disaster management policies in the Pekalongan Regency RTRW which are synchronized with UU No.24 tahun 2007 dan Perda Kabupaten Pekalongan nomor 1 Tahun 2016 Tentang Penyelenggaraan Penanggulangan Bencana. It should be noted that the Regional Spatial Plan is a policy that focuses more on spatial planning, so that the arrangements are more spatial in nature.

Table 3. Synchronization of Pekalongan Regency Disaster Management (Landslide Disaster) Policies

Law of the Republic of Indonesia Number 24 of 2007	Pekalongan Regency Regional Regulation Number 1 of 2016	Regional Regulation of Pekalongan Regency Number 3
Pre Disaster a. in non-disaster situations: • disaster management planning; • disaster risk reduction; • prevention; • integration in development planning; • disaster risk analysis requirements; • enforcement of spatial plans; • education and training; And • disaster management technical standard requirements. b. in situations where there is the potential for disaster. • preparedness; • early warning; and • disaster mitigation.	Pre Disaster a. in non-disaster situations: • disaster management planning; • disaster risk reduction; • prevention; • integration in development planning; • disaster risk analysis requirements; • enforcement of spatial plans; • education and training; And • disaster management technical standard requirements. b. in situations where there is the potential for disaster. • preparedness; • early warning; and • disaster mitigation.	Landslide prone area includes: a. Hills prone to landslides include: 1. Doro District; 2. Kajen District; 3. Karangayar District; 4. Kandangserang District; 5. Kesesi District; 6. Labakbarang District; 7. Paninggaran District; 8. Petungkriyono District; And 9. Talun District. b. Rivers prone to landslides include: 1. Karanganyar District; 2. Kedungwuni District; 3. Kesesi District; 4. Sragi District; And 5. Wonopringgo District.
Emergency Response a. rapid and precise assessment of location, damage and resources; b. determining the status of a disaster emergency; c. rescue and evacuation of disaster-affected communities; d. fulfilling basic needs;	Emergency Response a. rapid and precise assessment of location, damage and resources; b. determining the status of a disaster emergency; c. c. rescue and evacuation of disaster-affected communities; d. fulfilling basic needs;	Disaster Evacuation Network System a. Evacuation Route; b. evacuation room; And a. relocation land.

Law of the Republic of Indonesia Number 24 of 2007	Pekalongan Regency Regional Regulation Number 1 of 2016	Regional Regulation of Pekalongan Regency Number 3
e. protection of vulnerable groups; And f. immediate restoration of vital infrastructure and facilities.	e. e. protection of vulnerable groups; f. immediate restoration of vital infrastructure and facilities; And g. implementation of the final phase of disaster emergency response.	
Post Disaster a. rehabilitation; and b. reconstruction.	Post Disaster c. rehabilitation; and d. reconstruction.	

Source: Identification (processed from various sources), 2024

The role of RTRW if seen from the disaster management policy, is that the RTRW has mentioned landslide-prone areas or areas which include hill landslide-prone and river landslide-prone. Determining landslide-prone areas is part of the disaster management policy at the pre-disaster stage by being aware of landslide-prone areas. At the emergency and post-disaster response stages, the RTRW has also established a disaster evacuation network system which includes evacuation routes, evacuation rooms and relocation areas. Based on this, it can be said that this RTRW policy is in accordance with the directions of *Undang-Undang No.24 tahun 2007* dan *Perda Kabupaten Pekalongan nomor 1 Tahun 2016 Tentang Penyelenggaraan Penanggulangan Bencana* so that the evaluation result value is 100% appropriate.

b. Evaluation of the Implementation of Zoning Regulations

The evaluation carried out after the landslide-prone area was determined was to see the extent of implementation of the zoning provisions in tourist areas located in landslide-prone areas. These general provisions are seen from the general provisions of zoning regulations for landslide areas and general provisions for tourism areas.

Table 4. Evaluation of the Implementation of Zoning Regulations

General Provisions for RTRW Zoning in Tourism and Disaster Prone Areas	Evaluation of the Implementation of Zoning Regulations
General provisions of zoning regulations for landslide prone areas are prepared with the following provisions: a. permitted to develop land rehabilitation and soil conservation in areas prone to landslides;	• Evaluation of the implementation of zoning regulations in landslide-prone areas, especially in tourist areas, is still in accordance with the provisions contained in the RTRW.

General Provisions for RTRW Zoning in Tourism and Disaster Prone Areas	Evaluation of the Implementation of Zoning Regulations
b. permitted to post location information and evacuation routes from residential areas; c. permitted to construct buildings to withstand landslides; d. limited nature tourism activities and hardwood plantation activities are permitted; e. conditionally permitted to develop agricultural and plantation cultivation activities; And limited permits for existing settlements and prohibited from carrying out residential activities and construction of main infrastructure as well as built-up cultivation in landslide disaster areas except for the purposes of monitoring disaster threats.	• The tourist area developed in this zoning is a natural tourism area with a combination of forest land and plantations. **Evaluation of implementation of zoning regulations in landslide areas is 100% appropriate.**
General provisions of zoning regulations for tourism areas are prepared with the provisions: a. permitted limited development of commercial activities in accordance with the scale of tourism attraction; b. limited development of housing and settlement activities is permitted provided it is outside the main (core) tourism zone and does not disturb the natural landscape of tourism attractions; c. limited construction of tourism supporting buildings is permitted; And d. prohibited from carrying out activities that violate social, religious and moral norms.	• The zoning of tourist areas on the spatial pattern plan map in the RTRW does not appear, and all tourist locations on the spatial pattern plan are written as non-built land which includes: ✓ Food Plant Area ✓ River Borders ✓ Limited Production Forest Area ✓ Horticultural Area ✓ Limited Production Forest Area ✓ Limited Production Forest Area ✓ Food Plant Area ✓ Limited Production Forest Area ✓ Food Plant Area ✓ Limited Production Forest Area • All of the tourist attractions that are the focus of this research have complied with the provisions contained in the RTRW policy. All tourist attractions are natural tourism, most of which is forest land or food crops and only a few tourist support facilities such as gazebos and other supporting buildings are visible. **Evaluation of implementation of zoning regulations in tourist areas is 50% appropriate.**

Source: Analysis, 2024

Table 5 explains that the general provisions in landslide prone areas have all been fulfilled and are in accordance with those stated in the RTRW. Likewise with the provisions for tourist areas, where all tourist areas that are the focus of research are in accordance with RTRW directions. It is just that in the RTRW the zoning of tourist areas is not mapped, so it will be difficult to evaluate spatially. Tourist attractions developed in landslide-prone areas show green areas in the form of plantations and food crops and do

not see dense residential buildings. Figure 4 shows the condition of tourist attractions in the study area.

The Pekalongan Regency Spatial Plan is a general plan for the district's spatial planning, which contains objectives, policies, strategies for spatial planning for the district, a plan for the district's spatial structure, a plan for the district's spatial pattern, determination of strategies. district areas, instructions for the use of district area space, and provisions for controlling the use of area space. Meanwhile, disaster resilience is a program that aims to increase community preparedness in dealing with disasters. Peraturan Daerah Kabupaten Pekalongan Nomor 3 Tahun 2020 tentang Rencana Tata Ruang Wilayah Kabupaten Pekalongan Tahun 2020-2040 was carried out by looking at the dynamics of development and development of areas in Pekalongan Regency. The regulations and requirements contained in the RTRW regarding tourism areas and disaster-prone areas will be reviewed to analyze the role of the RTRW in creating disaster-resistant tourism areas. Tourist attractions in Petungkriyono District are included in the spatial pattern of limited production forest areas, food crop areas, horticultural areas and river boundaries and are included in areas prone to landslides. Table 5 illustrates how the implementation of zoning regulations can be evaluated.

Table 5. The Role of RTRW in Creating Disaster Resilient Tourism Areas

General Provisions for RTRW Zoning		**Evaluation of the Implementation of Zoning Regulations**
General provisions of zoning regulations for landslide-prone areas	a. permitted to develop land rehabilitation and soil conservation in landslide-prone areas; b. permitted to install location information and evacuation routes from residential areas; c. permitted to construct buildings to withstand landslides; d. permitted to have limited nature tourism activities and perennial plantation activities; e. conditionally permitted to develop agricultural and plantation cultivation activities; and f. permitted to have limited use for existing settlements and prohibited from carrying out settlement activities and construction of main infrastructure and built-up cultivation in landslide disaster areas except for the purpose of monitoring disaster threats.	• Nature tourism activities in Petungkriyono District in areas prone to landslides are in accordance with the provisions contained in the RTRW. This is considering that the type of tourism in Petungkriyono District is nature tourism, so tourism activities are permitted on a limited basis. • There needs to be a review and updating of the disaster management plan in Pekalongan Regency. • There needs to be a re-detailing of the general provisions for zoning in disaster-prone areas according to the classification of disaster risk, whether the risk of disaster is very low, medium, high or very high. This will be one of the efforts to control regional development in disaster-prone areas, especially in the

General Provisions for RTRW Zoning		Evaluation of the Implementation of Zoning Regulations
		classification of high and very high disaster risks. ***Evaluation of the implementation of zoning regulations in landslide areas is quite appropriate, but it is necessary to detail the regulations for each disaster risk classification, especially for high and very high disaster risks.***
General provisions of zoning regulations for river boundaries	a. permitted to utilize space for green open space; b. permitted conditionally for nature tourism activities on condition that they do not disrupt the quality of river water; c. permitted conditionally for the installation of billboards, information and warning boards, safety signs; d. permitted conditionally for the installation of electrical cable networks, telephone cables, and drinking water pipes; e. permitted conditionally for the construction of buildings to support river management functions, water utilization, nature tourism, docks, energy facilities and other functions that require a location on the riverbank in accordance with the provisions of laws and regulations; f. permitted limited to settlements that already exist at the time this regional regulation is stipulated, until the Regional Government or authorized institution moves them; g. prohibited from carrying out activities that threaten damage and reduce the quality of the river; and h. prohibited from carrying out soil and rock mining activities.	Nature tourism activities in the river border area are permitted on condition that they do not disrupt the quality of river water. ***Evaluation of the implementation of zoning regulations in the river border area is appropriate.***
General provisions of zoning regulations for production forest areas	a. conditionally permitted for the development of forestry businesses to support forest product utilization activities; b. conditionally permitted for the utilization of forest products to maintain the stability of the forestry resource balance; c. conditionally permitted for the utilization of forest land for the interests of joint forest management with the community in	• Utilization of forest land in limited production forest areas for tourism activities in accordance with the provisions contained in the RTRW. • Tourism development in this area needs to be re-examined considering that tourism in limited production forest areas is included in disaster-prone areas

General Provisions for RTRW Zoning		Evaluation of the Implementation of Zoning Regulations
	accordance with the provisions of laws and regulations; d. conditionally permitted for the development of forest product processing industries and their supporting facilities; e. conditionally permitted for the utilization of forest land for tourism activities in accordance with the provisions of laws and regulations; f. conditionally permitted for the development of public interest infrastructure and facilities in accordance with the provisions of laws and regulations; and g. prohibited from carrying out forest felling without permission from the authorized agency.	classified as high to very high and has quite high risks. ***Evaluation of the implementation of zoning regulations in limited production forest areas is quite appropriate but it is necessary to re-examine the regulations in locations that have a high and very high risk of landslide disasters.***
General provisions of zoning regulations for food crop areas	a. conditionally permitted the construction of agricultural support facilities; b. conditionally permitted the construction of agricultural support education and research facilities; c. conditionally permitted the conversion of sustainable food crop land for public interest in accordance with the provisions of laws and regulations; d. prohibited cultivation activities that reduce the area of land in the technical irrigation network rice fields; e. prohibited cultivation activities that reduce or damage land function and soil quality; f. prohibited from constructing buildings on the technical irrigation network; and g. conditionally permitted small-scale poultry and fisheries farming businesses.	Tourism development is directed outside the food crop area. This is done as a preventive effort against damage to land function and soil quality. ***Evaluation of the implementation of zoning regulations in food crop areas is quite appropriate, but tourism development can be carried out outside the food crop area.***
general provisions of zoning regulations for horticultural areas	a. permitted for the development of food crop cultivation, plantation crops, community forest crops and livestock; b. permitted conditionally for the development of educational and research facilities supporting agriculture, plantations and forestry; c. permitted conditionally for the development of infrastructure and facilities for the public interest in accordance with the provisions of laws and regulations;	• Development of tourist destinations in horticultural areas is permitted on condition that the KDB is less than 50%. • Tourism development in this area needs to be re-examined considering that tourism in the horticultural area is included in a very high disaster-prone area and has quite a high risk.

General Provisions for RTRW Zoning		Evaluation of the Implementation of Zoning Regulations
	d. permitted conditionally for the development of industrial businesses and/or facilities supporting agriculture, plantations, forestry, livestock and industries that process natural resources; e. permitted conditionally for the development of tourist destinations with a KDB of less than 50%; f. permitted conditionally for the use of space for farmer settlements in the form of single houses with low density; g. permitted for the development of green open spaces; and h. horticultural areas with a slope of more than 25% are directed to the cultivation of annual plants	***Evaluation of the implementation of zoning regulations in horticultural areas is quite appropriate but requires detailed regulation because it is included in a very high landslide-prone area.***
General provisions for zoning regulations for strategic areas in the socio-cultural sector	a. permitted to develop supporting facilities including trade and service facilities, entertainment, social services (health and worship); b. permitted to preserve local traditions and culture; c. permitted to develop tourism facilities in the buffer zones of tourist attractions; and d. permitted to carry out activities that violate social, religious, and moral norms.	• Petungkriyono District is included in the strategic area of the region from a socio-cultural perspective, namely as the Petungkriyono tourism area. • Details are needed regarding the requirements that need to be carried out in the development of the Petungkriyono tourism area, considering that it is included in an area prone to landslides. • A review is needed regarding the provisions in Article 72 paragraph (3) letter d in Pekalongan Regency Regulation No. 3 of 2020, in the clause "permitted to carry out activities that violate social, religious, and moral norms" which should be replaced with "not permitted to carry out activities that violate social, religious, and moral norms". ***Evaluation of zoning regulations in strategic socio-cultural areas needs to be reviewed.***

Source: Analysis, 2024

Figure 4. *Curug Bajing, Black Canyon, Curug Muncar (top left to right) and Lingga Yoni Site, Tlogo Sigebyar Mangunan, Welo Asri (bottom left to right)*

c. Evaluation of Program Implementation in Pekalongan Regency RTRW

The implementation of the program is seen from the PJM 1 program, namely 2020-2024. This evaluation was obtained from the results of activities carried out by the Pekalongan Regency Government which are in accordance with the RTRW mandate for disaster-prone areas and tourist areas. Table 6 is the result of an evaluation of program implementation in the Pekalongan Regency RTRW.

Table 6. Evaluation of Program Implementation

Program Implementation (PJM 1)	Evaluation of Program Implementation
Disaster Evacuation Network System • development of landslide disaster evacuation routes: • development of disaster evacuation space: • Land relocation is carried out if the disaster location can no longer be used.	In the disaster evacuation network system, there are 2 (two) parameters that are taken into account, namely the development of disaster evacuation routes and the development of evacuation rooms. Based on the results of field observations that have been carried out, the Pekalongan Regency Government has carried out these two activities at each target location. **Therefore, the percentage of implementation of indications for space utilization programs in the disaster evacuation network system is 100%.**
Realization of Tourist Areas 1. development of tourist attractions; 2. development of a tourist information center; 3. increasing and developing tourist attractions	In the realization of a tourist area, there are 3 (three) parameters that are taken into account, namely the development of tourist attractions, the development of tourist information centers, and the improvement and development of tourist attractions. Based on the results of field observations that have been carried out, the Pekalongan Regency Government is carrying out two of the three activities at each target location, namely the development of tourist attractions and the improvement and development of tourist objects, while what has not yet been carried out is the development of a tourist information center, this is

Program Implementation (PJM 1)	Evaluation of Program Implementation
	related to disaster information provided it really needs to be published. **Therefore, the percentage of implementation of indications of space utilization programs in the realization of tourist areas is only 66.67%.**

Source: Analysis, 2024

The development of tourism areas in the RTRW is regulated by the following provisions:

a. limited development of commercial activities is permitted according to the scale of tourism attractions;
b. limited development of housing and settlement activities is permitted on condition that it is outside the main (core) tourism zone and does not disrupt the natural landscape of tourism attractions;
c. limited construction of tourism support buildings is permitted; and
d. prohibited from carrying out activities that violate social, religious and moral norms

The provisions above have not yet touched on disaster mitigation regulations for tourism activities in disaster-prone areas. Disaster mitigation is an effort to reduce the risk of disaster, both before, during, and after a disaster occurs. Disaster mitigation aims to minimize the impact of disasters and increase public awareness of disaster risks. As in the Bogor Regency, disaster mitigation is one of the considerations in regulating general provisions for zoning in tourism areas, namely in Peraturan Daerah Kabupaten Bogor Nomor 1 Tahun 2024 which states that tourism areas located in disaster-prone areas in the use of their space need to consider disaster mitigation. In addition, there are building regulations such as Building Coverage, green space, building height, and boundary lines that are regulated in tourism areas.

In the Tegal Regency, disaster mitigation is also a consideration in the regulation in tourism areas, namely Peraturan Daerah Kabupaten Tegal Nomor 2 Tahun 2023 which states the utilization of water bodies, protected forests, borders, production forests, people's plantations, agriculture, fisheries, and settlements that can be utilized for the development of tourist attractions by considering the carrying capacity and environmental capacity, disaster mitigation and slopes with technical requirements in accordance with the provisions of laws and regulations. This means that disaster mitigation is needed in the regulation of tourism development, especially in disaster-prone areas as an effort to reduce the risk of disasters and minimize the impact of disasters. Building a conceptual map, either pictorial

or physical, can provide clues about the cross-scale interactions and system boundaries experienced by the community in the area in question

The various explanations above illustrate that a spatial plan must accommodate all possibilities that may occur in disaster-prone areas. To improve disaster mitigation, especially in tourist areas, the RTRW must include the zoning area permitted for built-up land, and mandatory requirements for tourism development in disaster-prone areas, especially landslides. In high-risk areas such as mountainous areas, infrastructure investments should focus on slope protection, retaining walls, and assessing the resilience of existing structures to geological disturbances. Regional planning regulations should be adaptive, reflecting the latest scientific findings and monitoring data to ensure that building codes are appropriate to enhance safety and resilience. In addition, educational programs should be established to raise awareness of geological hazards and promote community-based disaster preparedness (Xiao et al., 2025).

4. CONCLUSION

The role of the Pekalongan Regency RTRW in creating a disaster resilient area is seen based on 3 (three) aspects including evaluation of the Synchronization of Disaster Management Policies (Landslides), evaluation of the Implementation of Zoning Arrangements and evaluation of Program Implementation in the Pekalongan Regency RTRW. Overall, the RTRW content in policy synchronization is good, meaning that in the disaster management process the RTRW policy has determined disaster-prone areas and a system of disaster evacuation routes. In the evaluation of zoning arrangements, the policy in the RTRW only mentions tourist locations but there is no determination of tourist zoning on the spatial pattern planning map, making evaluation difficult. The implementation of zoning regulations so far is still good, where tourism activities in landslide-prone locations are still in accordance with the requirements stated in the RTRW. In the program evaluation at PJM 1, the disaster evacuation network system had been carried out well by the Pekalongan Regency Government, only in the implementation of the tourism area realization program, the Pekalongan Regency Government had only implemented 2 (two) activities, namely the development of tourist attractions and the improvement and development of tourist attractions. The Regional Spatial Planning Plan is a policy that focuses on spatial planning, so that the role of RTRW in this case is seen based on the implementation of spatial planning which includes zoning and implementation of spatial planning programs. The role of RTRW so far, namely during 2020-2024, has reached a total of 86% to create a disaster-resilient tourism area, consisting of 100% compliance with policy

synchronization, reaching 75% in evaluating zoning arrangements, and reaching 83% in evaluating program implementation (Strickland-Munro et al., 2010).

Other recommendations that can be given are related to improving regional infrastructure and involving the community. Some of the recommendations include: The first recommendation is to update the criteria for identifying urban areas in need of improvement to include characteristics of infrastructure and environmental exposure. The second recommendation is to prioritize sustainable infrastructure improvements in landslide-prone areas, and the third is to recognize the barriers that communities face in addressing the multiple factors that contribute to landslide risk and target interventions accordingly (MacAfee et al., 2024). Recommendations for future research are to explore the extent to which the threshold for tourism development in disaster-prone areas is permitted, assisted by spatial analysis and forecasting techniques. Research from Liu et al., (2025) shows that to see the slope gradient and instability during rain, a slope sensor can be used with the variables hydrodynamic response, slope morphology, displacement nephogram, and segment failure characteristics.

REFERENCES

Asmungi. (2019). Implementation of disaster management policy in Indonesia. Journal of Critical Reviews, 6(5), 67–70. https://doi.org/10.22159/jcr.06.05.11

Bose, M., Indraddin, De, T., & Channabasappa, K. (2025). Identification of landslide vulnerable zones in West Khasi District of Meghalaya. E3S Web of Conferences, 604, 0–6. https://doi.org/10.1051/e3sconf/202560404005

Direktorat Vulkanologi dan Mitigasi Bencana Geologi. 2004. Model Pendugaan Kawasan Rawan Tanah Longsor. Jakarta: DVMBG.

Dyah Susanti, P., Miardini, A., & Harjadi, B. (2017). Analisis Kerentanan Tanah Longsor Sebagai Dasar Mitigasi di Kabupaten Banjarnegara. 1(1), 49–59.

Liu, J., Liu, H., Luo, J., Chen, J., & Wang, H. (2025). Tilting deformation analysis and instability prediction of arch-locked-segment landslides induced by rainfall. Scientific Reports, 15(1), 3449. https://doi.org/10.1038/s41598-025-88186-y

MacAfee, E., de Jong, E., & Lohr, A. J. (2024). Leveraging local knowledge for landslide disaster risk reduction in an urban informal settlement in Manado, Indonesia. International Journal of Disaster Risk Reduction, 111(August), 104710. https://doi.org/10.1016/j.ijdrr.2024.104710

Paimin, Sukresno, & Budi Pramono, I. (2009). Teknik Mitigasi Banjir dan Tanah Longsor.

Priyono. (2015). Hubungan klasifikasi longsor, klasifikasi tanah rawan longsor dan klasifikasi tanah pertanian rawan longsor.

Putra, D. I., & Matsuyuki, M. (2019). Disaster management following decentralization in Indonesia: Regulation, institutional establishment, planning, and budgeting. Journal of Disaster Research, 14(1), 173–187. https://doi.org/10.20965/JDR.2019.P0173

Peraturan Daerah Kabupaten Pekalongan Nomor 1 Tahun 2016 Tentang Penyelenggaraan Penanggulangan Bencana

Peraturan Daerah Kabupaten Pekalongan Nomor 3 Tahun 2020 tentang Rencana Tata Ruang Wilayah Kabupaten Pekalongan Tahun 2020-2040

Peraturan Daerah Kabupaten Bogor Nomor 1 Tahun 2024 Tentang Salinan Rencana Tata Ruang Wilayah Kabupaten Bogor Tahun 2024 – 2044

Peraturan Daerah Kabupaten Tegal Nomor 2 Tahun 2023 Tentang Rencana Tata Ruang Wilayah Kabupaten Tegal Tahun 2023 - 2043

Ramadhan, A., & Muhamad Kurniawan. (2021). Evaluasi Pengembangan Tata Ruang Wilayah Terhadap Bencana Tanah Longsor di Kecamatan Cisarua, Kabupaten Bogor. Jurnal Geografi, Edukasi Dan Lingkungan (JGEL), 5(2), 73–83. https://doi.org/10.22236/jgel.v5i2.7019

Strickland-Munro, J. K., Allison, H. E., & Moore, S. A. (2010). Using resilience concepts to investigate the impacts of protected area tourism on communities. Annals of Tourism Research, 37(2), 499–519. https://doi.org/10.1016/j.annals.2009.11.001

Undang-Undang Republik Indonesia Nomor 24 Tahun 2007 Tentang Penanggulangan Bencana.

Xiao, W., Zhou, Z., Ren, B., & Deng, X. (2025). Integrating spatial clustering and multi-source geospatial data for comprehensive geological hazard modeling in Hunan Province. Scientific Reports, 15(1), 1982. https://doi.org/10.1038/s41598-024-84825-y