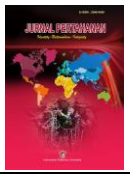

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Building Disaster Resilient Tourism through Strengthening Disaster Management Strategies in Batu City

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Abstract

Indonesia has a high intensity of disaster events. The high incidence of disasters in Indonesia has had a detrimental impact on several sectors, one of which is the tourism sector. This study was conducted to find out actors who play a role in disaster management strategy and their relation to national defense. This study used QGIS software, MICMAC, and MACTOR for analysis. MICMAC analysis emphasizes factors or variables, and then MACTOR emphasizes actors. This research found that the institutional capacity between institutions in Batu City was good, but still needed to be improved. The role of actors in improving disaster management in tourism areas in Batu City is very crucial, especially BPBD and DLH as actors who influence other actors on strategy and disaster management in Batu City. The role of actors in disaster management through risk mapping, preparing emergency response plans, and involving the community in prevention efforts are important actions in disaster management. The success of these efforts will contribute to overall national security and stability. This condition led to the involvement of the Indonesian National Armed Forces (TNI) in emergency disaster response operations.

INTRODUCTION

Indonesia has a high intensity of disaster events. According to the Center for Disaster Data (2021), disasters that occurred in Indonesia in 2015 were 1,694 disasters, in 2016 there were 2,306 disasters, in 2017 there were 2,866 disasters, in 2018 there were 3,397 disasters, in 2019 there were 3,814 disasters, in 2020 there were 4,650 and in 2021 as many as 5,402 disasters. The high occurrence of this disaster is because Indonesia is a confluence area of three actively moving earth plates, namely the Indo-Australian plate, the Eurasian plate, and the Pacific Plate, and is traversed by the world's

active mountain routes, namely the Pacific Circum and Mediterranean Circum. This causes Indonesia to be part of the world's Ring of Fire trajectory or the world's Pacific Ring of Fire, which is an active mountain route, so Indonesia is vulnerable to tectonic and volcanic earthquakes. The potential for natural disasters has a broad impact on people's lives consisting of tsunamis, earthquakes, floods, tornadoes, droughts, landslides, volcanic eruptions, as well as forest and peatland fires which result in haze disasters. Natural disasters that frequently occur in several countries are challenges and risks that will continue to be faced and need to be anticipated by every country.

The Indonesian government through Law Number 3 of 2002 concerning National Defense states that a universal defense system involves all citizens, territories, and other national resources, and is prepared early by the government and implemented in a total, integrated, directed, and continues to uphold state sovereignty, territorial integrity, and the safety of the entire nation from all threats. About this law, issues related to disaster management are important in maintaining national defense considering that Indonesia is known to have a good reputation in dealing with threats from disaster management mechanisms. Threats According to Law Number 3 of 2002 concerning National Defense, threats are divided into military and non-military threats. Military threats are threats that are conventional and immediately involve war, while non-military threats are threats that can damage without requiring direct contact with the object, such as nuclear, biological, and chemical threats, for instance, COVID-19.

The high incidence of disasters in Indonesia has had a detrimental impact on several sectors, one of which is the tourism sector. Batu City is one of the regions in Indonesia with a potential tourism sector. Based on the Disaster Risk Index (IRB) issued by the National Agency for Disaster Management (*Badan Nasional Penanggulangan Bencana,* hereinafter called BNPB) in 2021, Batu City has a moderate category of disaster Susceptibility (Center for Disaster Data Information and Communication of the National Disaster Management Agency, 2021). This city also has the status of a high-risk area in the spread of the COVID-19 outbreak and has caused a significant decrease in the number of visitors to tourist attractions from 2019 to 2020 (Wang & Su, 2020; East Java Provincial Government, n.d; Sharma, Thomas, & Paul, 2021).

In recent decades, there has been a growing significance placed on disaster-related concerns. Various studies have been conducted on disaster management, not only by the government but also by non-governmental organizations and the community. The government introduced Law Number 24 of 2007, which serves as the foundation for disaster risk reduction. Initially, the government's approach to disaster management was primarily responsive, focusing on emergency response to mitigate the impact of disasters. However, the current approach emphasizes prevention to reduce the impact of disasters (Faturahman, 2018).

While research has been conducted on disaster management such as Prasetyo, Pusparini, & Radjawanne (2019) observed Banda Sea temperature related to El Niño events in the East Pacific and Central Pacific to understand the response of Banda Sea vertical sea temperature profile to both El Niño types using Simple Ocean Data Assimilation (SODA) for 60 years, Oceanic Nino Index (ONI), and mixed layer depth (MLD) from SODA3. Priscilla, Schillaci, & Lipani (2021) studied floods to predict the susceptibility of floods using the Sentinel-1 satellite. Syarifah, Poli, Ali, Rahmat, & Widana, 2020; Sulistiawan et al., 2022; Rahadian, Priyanto, & Winarna (2023) studied disaster management and its relation to national defense. Suprapto (2022) also conducted research in disaster management using MICMAC and MACTOR but did not relate it to national defense. There has been limited exploration of the roles of actors

involved in disaster management and their relationship to national defense. Therefore, further investigation is necessary to address this gap and gain a better understanding of the topic. This study aims to examine the actors involved in disaster management strategy and their relation to national defense, as it is an area that requires further exploration.

METHODS

This paper presents a study conducted in Batu City, located in East Java, with specific geographical coordinates 112°17'10.90" to 122°57'11" East Longitude and 7°44'55.11" to 8°26'35.45" South Latitude. Schmidt-Ferguson climate type in the research area is moderate to very wet (Sasminto, Tunggul, & Widiatmono, 2014). The administrative area of Batu City consists of 3 sub-districts which were subdivided into 19 villages and 5 sub-districts. This city area is located at an altitude of 680-1200 meters above sea level. The research was carried out over six months, from November 2021 to April 2022. Researchers have been conducting since 2015-2020 for time series data collection. The data used in this research were Batu City Regional Planning and Batu City Tourism Policies obtained from Batu City's Central Agency on Statistics (BPS) and other supporting literature. This study used QGIS software, MICMAC, and MACTOR for analysis both in tourist sites and institutions involved. The study collected both primary and secondary data, focusing on the institutional capacity of Batu City in managing various disasters such as floods, landslides, droughts, land fires, and the COVID-19 pandemic. This study involved 11 actors Regional Planning Agency (*Badan Perencanaan Pembangunan Daerah* or Bappeda), Regional Agency for Disaster Management (*Badan Penanggulangan Bencana Daerah* or BPBD), Environmental Office (*Dinas Lingkungan Hidup* or DLH), Tourism Office (*Dinas Pariwisata* or Dinpar), Agriculture Office (*Dinas Pertanian* or Dintan), Agrarian Affairs and Spatial Planning/National Land Agency of Batu City (*Kementerian Agraria dan Tata Ruang/Badan Pertanahan Nasional* or ATR/BPN), Health Office (*Dinas Kesehatan* or Dinkes), Meteorology, Climatology and Geophysical Agency (*Badan Meteorologi, Klimatologi, dan Geofisika* or BMKG), Junrejo District, Batu District, and Bumiaji District. This study also involved 29 tourism object institutions (Coban Rais Ecotourism, Mega Star Indonesia, Batu Night Spectacular, Sumberejo Tourism Village, Angkut Museum, Kusuma Agrowisata, Mahajaya T-shirt dan Souvenir, Brawijaya Souvenir, Batu Rafting, Jatim Park 1, Eco Green Park, Pemandian Tirta Warna, Banyak Mountain, Jatim Park 2, Wonderland Waterpark, Bumiaji Tourism Village, Rafting Kaliwatu, Kampoeng Kidz, Dolan Park, Petik Apel Mandiri, Kungkuk Tourism Village, Batu Agro Apel, Pemandian Air Panas Cangar, Selecta Recreation Park, Coban Talun Ecotourism, Petik Apel 'Makmur Abadi', Jatim Park 3, Vihara Dammadhipa Arama, and Predator Fun Park).

The MICMAC method is widely utilized in sustainability analysis both in sectoral contexts as well as regional and rural development contexts. Almeida & Moraes (2013) use MICMAC to determine technological variables that contribute to Sustainable Development. MICMAC analysis emphasizes factors or variables, and then MACTOR emphasizes actors. MICMAC or Matrix of Cross Impact Multiplications Applied to A Classification classifies research variables into four quadrants based on dependency and influence, as can be seen in Figure 1:

Quadrant I This quadrant contains influence variables or determinant variables which are key variables that are very influential but have slight dependence.	**Quadrant II** This quadrant contains dependent variables that have high dependency but a slight effect. This causes the variables in this quadrant to be very sensitive to the influence and relay variables
Quadrant IV This quadrant contains excluded variables or autonomous variables that have a slight influence and dependency. This causes this variable to not affect the system.	**Quadrant III** This quadrant contains dependent variables that have high dependency but a slight effect. This causes the variables in this quadrant to be very sensitive to the influence and relay variables

Figure 1. Quadrant of MICMAC MACTOR

MACTOR operates by analyzing the relative influence between actors or stakeholders and examining the similarities and differences in their problems and goals. In this approach, actors are defined as entities that shape the direction of a system and utilize resources to affect outcomes directly or indirectly, including setting objectives and indicators for sustainability. On the other hand, factors or issues refer to variables, ideas, topics, problems, or subjects that spark discussions. The MACTOR method, as described by Godet (1991), involves identifying key variables and engaging actors. Godet, Monti, Meunier, & Roubelat (2000) outline the MACTOR technique, which revolves around a matrix that represents the "influence relationship" between actors. The input for MACTOR is obtained through a position matrix (known as 2MAO or Matrix Actor Objective) that incorporates the actor's Salience towards the objective. To begin the MACTOR process, a Focus Group Discussion (FGD) or interviews with a questionnaire can be conducted. Filling in the table was carried out by the researcher based on the results of the FGD and questionnaire together with the 11 institutions involved, namely Regional Planning Agency (Bappeda), Regional Agency for Disaster Management (BPBD), Environmental Office (DLH), Tourism Office (Dinpar), Agriculture Office (Dintan), Agrarian Affairs and Spatial Planning/National Land Agency of Batu City (ATR/BPN), Health Office (Dinkes), Meteorology, Climatology and Geophysical Agency (BMKG), Junrejo District, Batu District, and Bumiaji District. Subsequently, the Matrix of Direct Influence (MDI) table is completed, which illustrates the influence of actors on one another. Table 1 displays the MDI table, with scores ranging from 0 (no effect) to 4 (significant impact on actor existence).

Table 1. MDI's Table

Actor i / Actor j	Regional Government	BPBD	BNPB	(Can adjust based on the results of the FGD/Structured Interview)
Regional Government	0			
BPBD		0		
BNPB			0	
Can adjust based on the results of the FGD/Structured Interview)				

Table 2. 2MAO's Table

The objective / Actor i	COVID-19 Management	Land Fire Management	Drought Management	Flood Management	(Can adjust based on the results of the FGD/Structured Interview)
Regional Government					
BPBD					
BNPB					
Can adjust based on the results of the FGD/Structured Interview)					

Filling in numbers or scores in the MDI matrix is carried out using Godet's rule, in which the influence of actor i on actor j is calculated based on a score of 0-4 with the following provisions (Godet, 1991):
0: no effect;
1: Affect operational procedures;
2: Affect work;
3: Affect the actor's mission;
4: Affects the existence of actors

Actor i is the actor whose influence is observed on other actors (actor j) e.g., Regional Government to Regional Government, Regional Government to BPBD, and so on. After filling in the MDI, the next step is to fill in the Actor-Objective or 2MAO (Table 2) examination which requires all cells to be filled with a score of 0-4 which means:
0: The objective has a dismal outcome (*bleck outcome*);
1: The objective interferes with the actor/vital procedure for the actor's operational procedures;
2: The objective interferes with the actor's job success/vital for job success;

3: The objective interferes with the achievement of the actor's mission/is non-negligible for the actor's mission;
4: The objective of interfering with the existence of actors/cannot be ignored for the existence of actors.

In the next step, MACTOR will calculate the 3MAO matrix, which is the matrix which is the basis and important in the MACTOR discussion. The specific methods are as follows:

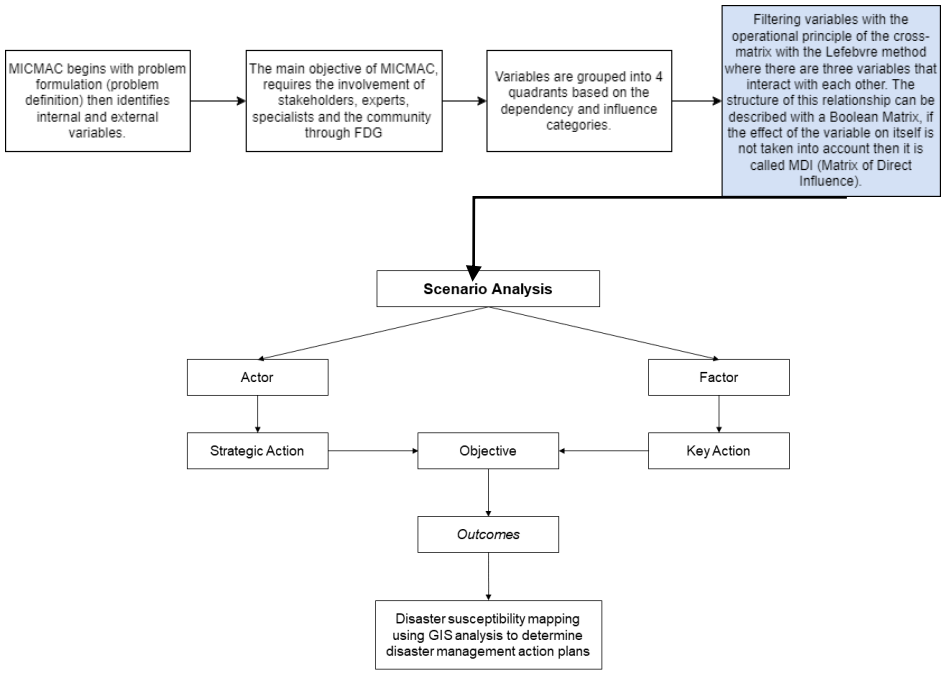


Figure 1. Research Workflow

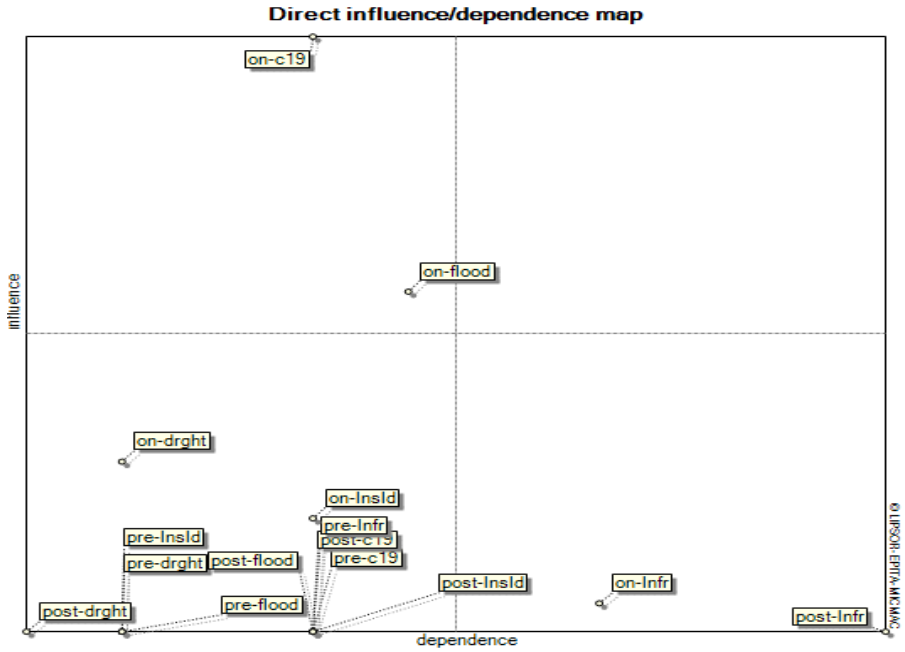
RESULT AND DISCUSSION

Exploring the Resilience of Institutions in Implementing Disaster Management Strategies

This study examined the institutional capacity in developing Batu City as a disaster-resilient tourism destination, focusing on the level of resilience, strategic readiness, and efforts of relevant actors. The analysis revealed strong evidence indicating that Batu City is indeed a resilient tourism city in the face of disasters. Consequently, it is essential to examine the institutional capacity of policymakers and implementers involved in disaster strategies, particularly in the tourism sector, to ensure the successful development of the Disaster Resilient Area in Batu City.

The implementation of disaster management systems involves various aspects, such as legislation, planning, institutions, and funding, which support activities and capacity building in disaster management (Sukrismanto, Alikodra, Saharjo, & Kardono, 2011; Water Resources and Construction Education and Training Center, 2017). The government plays a crucial role in disaster management, encompassing disaster prediction, long-term preparedness for recovery and reconstruction, and the establishment of long-term disaster risk management measures (Paltemaa, 2017). To assess preparedness in dealing with disasters, including floods, landslides, drought, land fires, and COVID-19, the management and strategies of the Batu City Government and

tourism site managers were analyzed. The analysis covered the pre-disaster, during-disaster, and post-disaster phases. Information regarding the current state of disasters and the corresponding strategies was obtained through structured interviews and written questionnaires from the eleven local government organizations and 29 tourist attraction managers in Batu City.



Description

No	Short label	Long label
1	pre-c19	pre COVID-19 handling
2	on-c19	on COVID-19 handling
3	post-c19	post COVID-19 handling
4	pre-lnfr	Pre-land fire handling
5	on-lnfr	on land fire handling
6	post-lnfr	post land fire handling
7	pre-drght	pre drought handling
8	on-drght	on drought handling
9	post-drght	post drought handling
10	pre-flood	pre-flood handling
11	on-flood	on flood handling
12	post-flood	post flood handling
13	pre-lnsld	pre landslide handling
14	on-lnsld	on landslide handling
15	post-lnsld	post landslide handling

Figure 2. Map of Influence and Dependence between Disaster Conditions in Batu City

The analysis conducted using the MICMAC method on the eleven institutions in Batu City, as illustrated in Figure 2, reveals that the management of COVID-19 and flood disasters falls within Quadrant I. This indicates that effectively handling these two disasters significantly impacts the management of other pre-disease-post-disasters in Batu City. The COVID-19 crisis hinders various disaster management activities, such as outreach and direct training in the field, potentially leading to the emergence of new COVID-19 clusters in evacuation areas following a disaster. Furthermore, the inadequate

management of medical waste resulting from COVID-19 has caused a buildup of waste in water bodies like rivers, which, in turn, increases the risk of flooding. While the management of COVID-19 has a significant influence on other disasters, it has a low dependency on the activities related to managing other disasters (Zambrano-Monserrate, Ruano, & Sanchez-Alcalde, 2020). Based on these findings, it is crucial for the Batu City Government to effectively manage the COVID-19 disaster to ensure the timely implementation of other disaster management efforts. Managing flood disasters also significantly affects the management of other disasters, as it falls within Quadrant I. This can be attributed to the fact that flooding can trigger landslides caused by soil erosion carried away by the floodwaters (Schuster & Fleming, 1986; Sucahyono & Ribudiyanto, 2013). Following a flood, rehabilitation, and reconstruction efforts, such as repairing buildings and facilities and providing shelter for affected residents, become necessary. Therefore, effective management during flood occurrences is vital to prevent exacerbating conditions even in the aftermath of the flood.

The analysis presented in Figure 2 reveals two scenarios in Quadrant III: managing during and after a land fire disaster. While disaster management under these circumstances has a low influence on other disaster management, it exhibits a high dependency. The impact of managing forest fires correlates well with the management of other disasters. However, preventing forest fires, including through better management of drought disasters, could yield more optimal outcomes. In Quadrant IV, there are eleven other disaster management situations, indicating that the disaster management practices associated with these conditions have minimal influence and dependence on other disaster management efforts. The disaster management carried out by the Batu City Government in these eleven situations has made little contribution to addressing disaster-related issues. As can be seen in Figure 2, there are no actors in Quadrant II because there is still no actor that works optimally by the duties and functions of each actor.

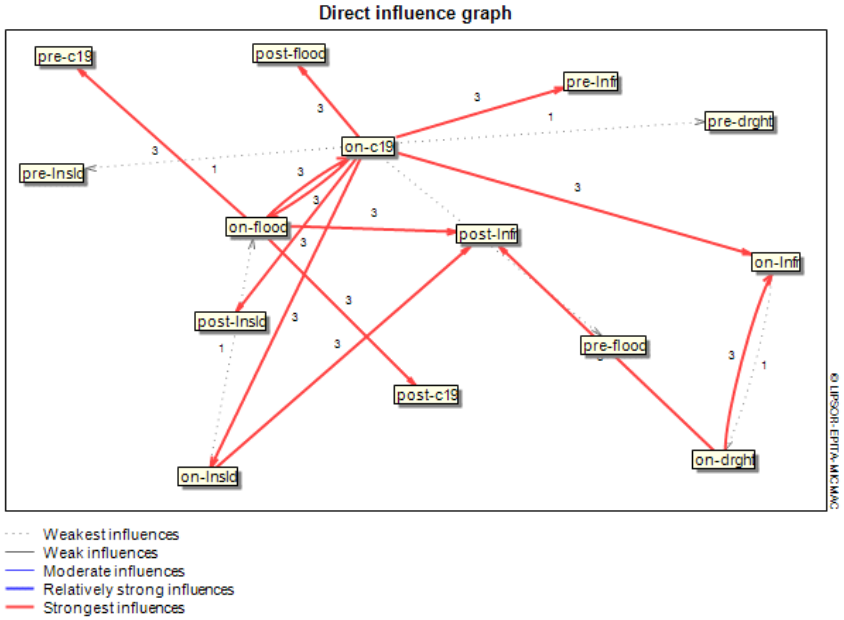
The COVID-19 disaster has limited the implementation of activities from pre-disaster to post-disaster, such as direct disaster counseling and training to the community during pre-disaster, to the creation of new COVID-19 clusters in post-disaster evacuation areas. Due to the handling of the COVID-19 disaster, has also led to an increase in medical waste. Garbage from the handling of the COVID-19 disaster will be found in many water areas (especially rivers), thereby increasing the potential for flooding. Therefore, the handling of the COVID-19 disaster by the Batu City Government is needed to avoid these things. Handling the COVID-19 disaster has very low dependence. This shows that the handling of the COVID-19 disaster does not depend on handling activities caused by other disasters.

Handling when a flood disaster occurs is also in Quadrant I. This means that handling when a flood disaster occurs has an influence on other disasters and does not have a dependency on other disaster conditions. Floods can cause landslides because the eroded soil conditions are carried away during a flood. Floods also led to the need for post-flood rehabilitation and reconstruction, such as repairing buildings, providing evacuees, and so on. Therefore, flood disaster management is needed so that this condition can be avoided.

Readiness of Institutions in Terms of Strategic Disaster Management Strategies.

Figure 3 illustrates the direct impact of the government of Batu City's management on disaster conditions. The analysis reveals that the majority of disaster management efforts have a significant direct influence on other disaster management activities. Weak

influence is observed in managing disasters during COVID-19 and handling pre-disaster flooding, managing disasters during COVID-19, and handling post-disaster drought, and managing disasters during COVID-19 and handling pre-disaster landslides. This highlights the crucial role played by the Batu City Government in disaster management, as it directly affects other disaster management efforts.



Description:

0	Has no influence
1	Has a weak influence
2	Has moderate influence
3	Has a strong influence
P	Has the potential to influence

Figure 3. Direct Influence between Disaster Conditions Carried out by the Regional Government of Batu City

At the institutional level, the study encompasses various types of disasters such as floods, landslides, droughts, wildfires, and the COVID-19 pandemic. The analysis of these disasters includes their management before, during, and after the occurrence. To elucidate the concepts of disaster management and strategies, a total of 29 tourist attractions were observed. These attractions encompass natural and man-made sites, as well as those with unique, religious, and souvenir-related characteristics. The relationship and interdependence between the management of disaster conditions in Batu City and the operational framework of tour providers are illustrated in the following map.

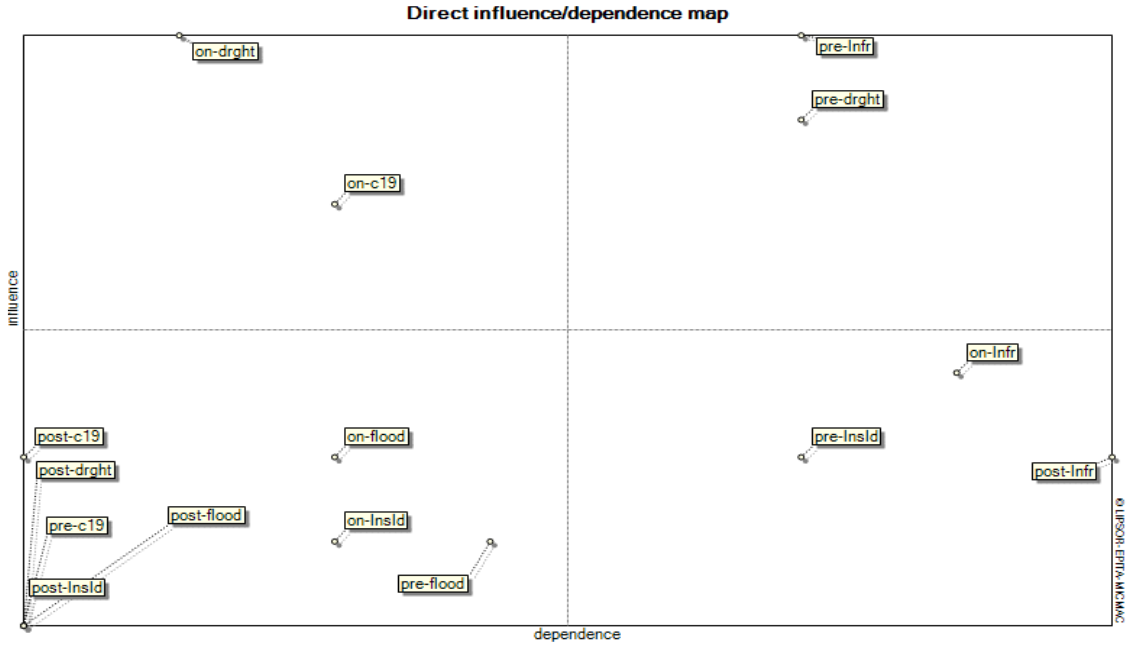


Figure 4. Map of Influence and Dependence between Disaster Conditions on Batu City Tourism Objects

The analysis of disaster management and strategies conducted by 29 managers in an object in the Batu City Tourism Area is examined using MICMAC. According to the analysis shown in Figure 4, the management activities during the COVID-19 pandemic and drought fall under Quadrant I. This indicates that the managers' focus on handling their influence in managing disasters is higher compared to managing other tourism objects involved in the research. This could be due to the limited execution of activities from pre- to post-disaster, mainly caused by the impact of COVID-19. However, the management of the COVID-19 disaster and drought has very low dependency on other disasters, implying that their occurrence is not influenced significantly by other factors.

In Quadrant II, the management of pre-fire and pre-drought shows both high influence and dependency on other disasters. This can be attributed to the efforts made to mitigate the risks of fire and drought that have previously occurred (Schreider, 2009; Trnka et al., 2011; Wittwer & Griffith, 2011; Mysiak, De Salvo, Santato, & Amadio, 2013; Ray, Fares, & Risch, 2018). These actions aim to reduce the potential occurrence of subsequent disasters, such as reforestation to prevent floods and soil landslides. Quadrant III comprises the management of disaster timing, post-fire activities, and pre-avalanche management, all of which have an external influence on managing other disasters. Despite the management efforts in these three conditions, there is no notable push to handle other disasters. However, it is worth noting that the management of these specific disasters alone is not sufficient to effectively address other disaster issues. Finally, eight other disaster management activities are positioned in Quadrant IV, displaying low influence and dependency on managing other disasters. The managers' actions in these cases do not have a significant impact on addressing disaster-related concerns in the tourism area.

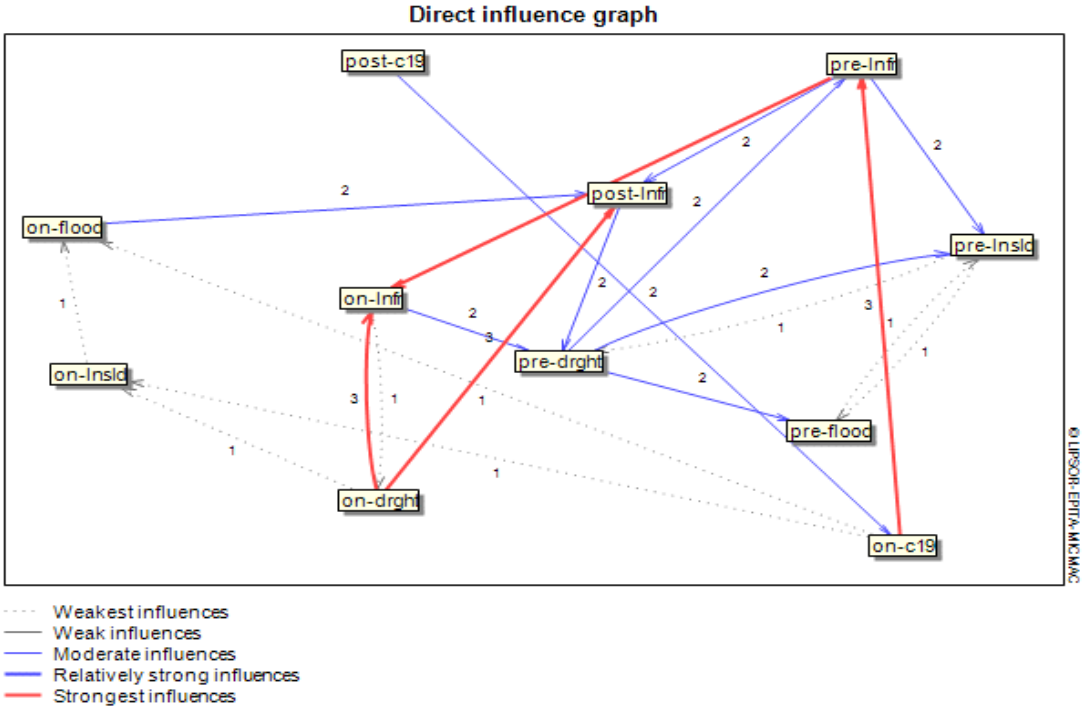


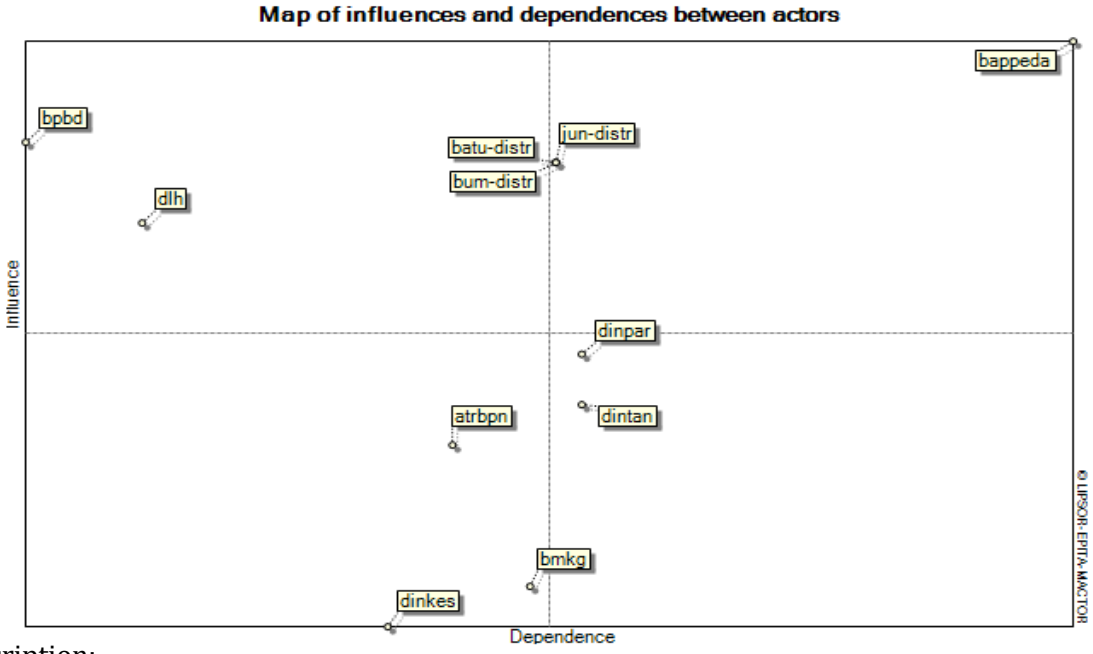
Figure 5. Map of Direct Influence between Disaster Conditions in 29 Tourist Attractions

The graph in Figure 5 illustrates the direct impact of disaster management conducted by tourist sites in Batu City as a result of MICMAC analysis. It demonstrates that the widespread implementation of disaster management has a substantial and immediate influence on other disaster management activities. This indicates that the disaster management carried out at 29 tourist sites in Batu City plays a crucial role in directly affecting the management of other disasters. Given that the research was conducted during the COVID-19 pandemic, the focus of the analysis is primarily on managing conditions during this crisis. Consequently, the Batu City Government has prioritized the management of COVID-19 as a National Priority by implementing the policy of Imposing Restrictions on Community Activities (*Pemberlakuan Pembatasan Kegiatan Masyarakat* or PPKM).

According to the 2017-2022 Regional Medium-Term Development Plan for Batu City, drought poses significant threats and risks that can hinder the implementation of tourism activities in the area. Hence, institutions and tourism site managers must develop effective strategies and initiatives to address each disaster. These efforts involve the establishment of a Disaster Risk Management Forum (*Forum Relawan Penanggulangan Bencana* or FRPB) at the village level, in collaboration with tourism site managers supervised by BPBD. The forum aims to disseminate information to the public about disasters and enhance disaster preparedness.

Understanding The Responsibilities of Actors in Disaster Management Strategies

An analysis known as MACTOR was conducted to assess the connection between these actors and their contributions to the management and strategy of tourism-related disasters in Batu City. The analysis focused on both institutional levels and tourist attraction managers, using questionnaires and interview findings. Specifically, eleven regional institutions responsible for implementing disaster strategies in Batu City were scrutinized at the institutional level.



Description:

No	Short label	Long label
1	bappeda	Regional Planning Agency
2	bmkg	Meteorology, Climatology and Geophysical Agency
3	atrbpn	Agrarian Affairs and Spatial Planning/National Land Agency of Batu City
4	dinkes	Health Office
5	dintan	Agriculture Office
6	bpbd	Regional Agency for Disaster Management
7	dlh	Environmental Office
8	dinpar	Tourism Office
9	batu-distr	Batu District
10	jun-distr	Junrejo District
11	bum-distr	Bumiaji District

Figure 6. Map of Inter-Institutions (Actors) Playing a Role in Disaster Strategy in the Batu City Tourism Area

Figure 6 illustrates the institutions involved in disaster strategy within the Batu City Tourism Area. In the first Quadrant, the BPBD and DLH are identified as influential actors with a significant impact on strategy and disaster management in Batu City. These institutions have minimal reliance on other organizations in their strategies and management, emphasizing their crucial role in implementing disaster strategies. Moving to the second Quadrant, Bappeda, Junrejo District, Bumiaji District, and Batu District are identified as four institutions that significantly influence strategy and disaster management while depending heavily on other institutions. These institutions need to collaborate effectively to optimize the implementation of disaster strategies.

According to Figure 6, Quadrant III consists of two institutions: the Department of Tourism and the Office of Agriculture. The figure indicates that these institutions rely heavily on other organizations, but their impact on disaster strategy could be enhanced. Quadrant IV, on the other hand, includes three institutions: the Health Office, ATR/BPN, and BMKG. These institutions exhibit low dependence on other organizations and have a minimal influence on disaster strategy. As a result, their role in shaping the strategy in the Batu City Area is negligible.

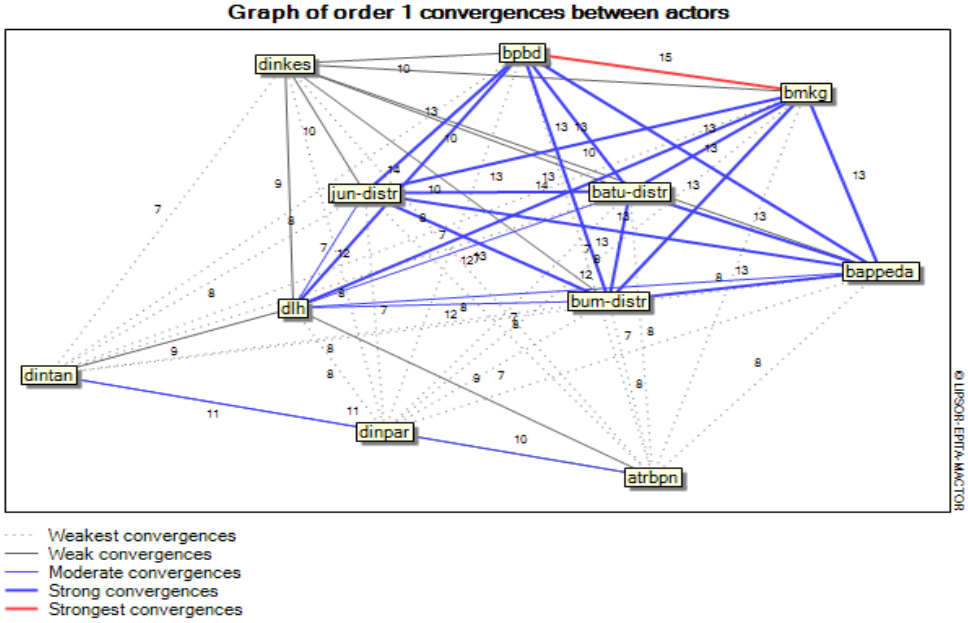


Figure 7. Inter-Institutional Convergence Map (Actors) Playing a Role in Disaster Strategy in Batu City Tourism Area

Figure 7 presents a convergence map illustrating the similarity of roles among institutions in Batu Tourism City as a result of MACTOR analysis, highlighting potential collaborations for disaster management. The findings indicate that the BPBD and BMKG in Batu City exhibit the highest potential for cooperation. Given the occurrence of changes in meteorological, climatological, and geophysical conditions, the BPBD and BMKG must work closely together in addressing disasters. Additionally, the Junrejo District, Batu District, Bumiaji District, Environmental Service, and Bappeda also demonstrate solid potential for collaborative efforts in implementing disaster strategies. The Department of Tourism, ATR/BPN, and the Department of Agriculture show a moderate level of potential cooperation. Consequently, there is a need to enhance cooperation between these three institutions while also engaging with other institutions that currently have relatively low linkages.

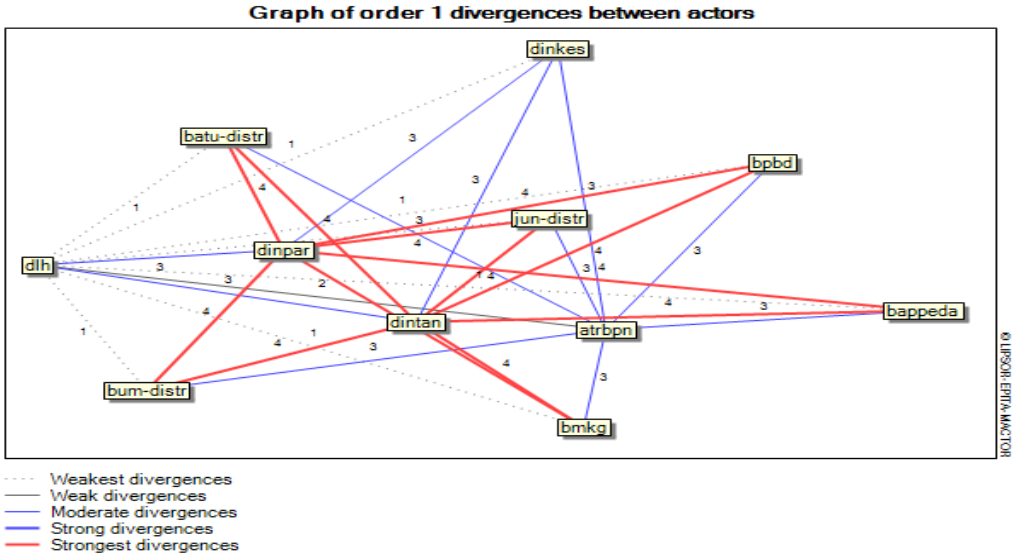


Figure 8. Divergence Map between Institutions (Actors) Playing a Role in Disaster Strategy in the Batu City Tourism Area

Figure 8 illustrates the divergence map among various institutions involved in disaster strategy in Batu City as a result of MACTOR analysis. This map showcases the distinct roles played by each institution and highlights potential conflicts of interest that may arise. Notably, there are significant divergences between the BPBD and the Tourism Office, the BPBD and the Agriculture Service, the Agriculture Service and Bappeda, the Agriculture Service and the Three District Parties in Batu City, the BMKG and the Agriculture Service, the BMKG and the Tourism Office, the Tourism Office and ATR/BPN, the Tourism Office and the Three District Parties in Batu City, as well as the Tourism Office and Bappeda. According to these findings, conflicts may arise among the BPBD, the Tourism Office, and the Agriculture Service when implementing disaster management strategies. This potential for conflict stems from the fact that the BPBD's management efforts may disrupt the projects or activities undertaken by the Tourism Office and the Agriculture Service. For example, when a disaster occurs, the Tourism Office may aim to increase tourist numbers, while the Agriculture Service may prioritize increasing agricultural land productivity. This misalignment necessitates the BPBD to carry out disaster evacuations. Furthermore, the Tourism Office may encounter conflicts with Junrejo District, Bumiaji District, Batu District, and BMKG in their pursuit of establishing a disaster-resilient tourist city. These conflicts can arise because the respective institutions are responsible for ensuring environmental sustainability in the area, and any disruption caused by tourism activities may lead to conflicts. Therefore, it is crucial to prioritize efforts in disaster management to mitigate conflicts of interest among the institutions involved.

3MAO	pre-c19	on-c19	post-c19	pre-flood	on-flood	post-flood	pre-Insld	on-Insld	post-Insld	pre-Infr	on-Infr	post-Infr	pre-drght	on-drght	post-drght	Mobilisation
bappeda	2.1	3.1	2.1	3.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	2.1	0.0	2.1	1.0	28.2
bmkg	0.8	0.8	0.8	3.1	1.6	3.1	2.3	3.1	2.3	3.1	3.1	3.1	3.1	2.3	3.1	35.9
atrbpn	1.8	1.8	0.9	2.7	-2.7	2.7	0.0	-1.8	1.8	0.0	-1.8	1.8	0.0	0.0	1.8	21.4
dinkes	1.6	3.2	3.2	0.0	1.6	1.6	0.0	1.6	2.4	0.0	1.6	2.4	0.0	0.0	0.8	19.7
dintan	0.9	1.8	1.8	0.9	-1.8	0.9	0.0	-2.7	1.8	0.0	-2.7	1.8	0.0	-1.8	0.9	19.8
bpbd	3.8	5.0	2.5	5.0	5.0	5.0	3.8	5.0	5.0	3.8	5.0	5.0	3.8	5.0	5.0	67.6
dlh	1.1	2.3	1.1	3.4	3.4	3.4	4.6	-3.4	2.3	2.3	3.4	2.3	2.3	2.3	2.3	40.1
dinpar	0.9	2.8	0.9	0.0	-1.9	0.9	0.0	-2.8	0.9	0.0	-2.8	0.9	0.0	-1.9	0.9	18.0
batu-distr	3.2	4.3	2.2	2.2	3.2	2.2	1.1	4.3	2.2	0.0	3.2	2.2	0.0	3.2	2.2	35.7
jun-distr	3.2	4.3	2.2	2.2	3.2	2.2	1.1	4.3	2.2	0.0	3.2	2.2	0.0	3.2	2.2	35.7
bum-distr	3.2	4.3	2.2	2.2	3.2	2.2	1.1	4.3	2.2	0.0	3.2	2.2	0.0	3.2	2.2	35.7
Number of agreements	22.7	33.8	19.8	24.8	23.4	26.3	16.0	24.8	25.1	9.2	25.0	25.9	9.2	21.5	22.4	
Number of disagreements	0.0	0.0	0.0	0.0	-6.4	0.0	0.0	-10.8	0.0	0.0	-7.3	0.0	0.0	-3.7	0.0	
Degree of mobilisation	22.7	33.8	19.8	24.8	29.8	26.3	16.0	35.6	25.1	9.2	32.3	25.9	9.2	25.2	22.4	

Figure 9. Matrix of Weighted Values of Regional Institutional Positions (Actors) or 3MAO

The implementation of the disaster management strategy in Batu City involves various institutions working towards the objectives. By examining the 3MAO matrix in Figure 9 as a result of MACTOR analysis, we can identify the most engaged actors in this process. The analysis reveals that the BPBDs are the most active regional institutions, scoring 67.6. This agency plays a significant role in disaster management through its dedicated programs and activities, leading to effective disaster mitigation and management. Additionally, the Environment Agency and BMKG also demonstrate considerable involvement in implementing strategies and managing disasters, scoring 40.1 and 35.9 respectively. These institutions have implemented multiple programs and activities specifically designed for strategy implementation and disaster management. The analysis further indicates that the occurrence of landslides motivates regional institutions to actively mobilize their efforts, as evidenced by a score of 35.6 in strategy implementation and disaster management.

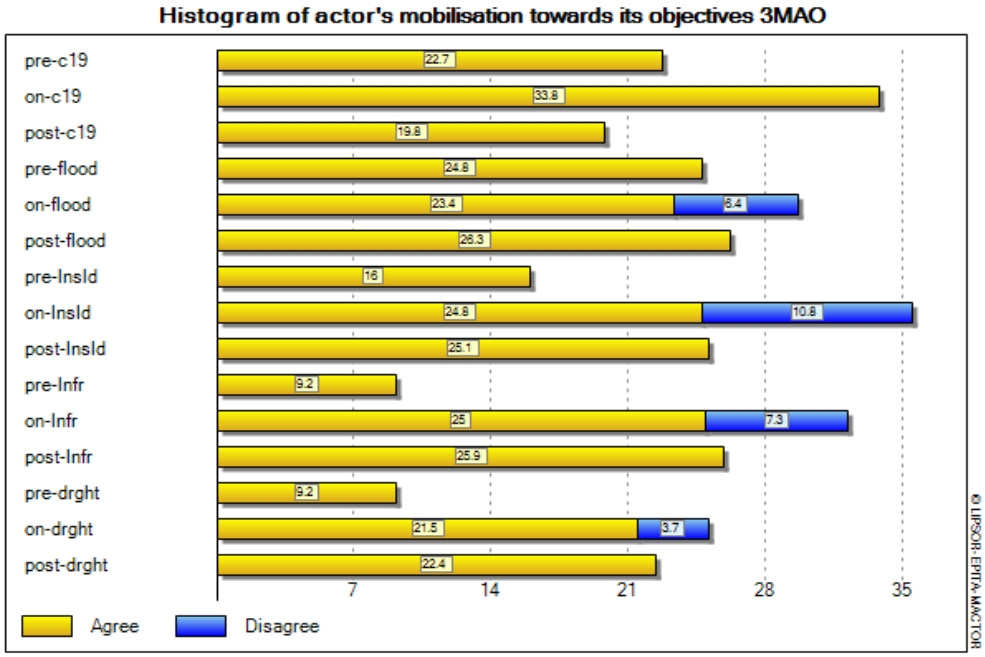


Figure 10. Histogram of Achievement of Batu City Regional Institutional Goals on Disaster Handling Efforts

The utilization of matrix 3MAO enables the visualization of analysis outcomes, illustrating the achievement goals of managing institutional disasters in Figure 10 through a histogram-based representation as a result of MACTOR analysis. The image indicates varying levels of mobility and support within different regions of the institution regarding the implementation and management of strategies during disasters. In Batu City, institutional areas show unanimous support for addressing various types of disasters, including the COVID-19 pandemic, floods, landslides, fire incidents, and droughts, both before and after these events. However, when it comes to managing specific moments of disaster, such as floods, landslides, fires, and droughts, different institutions hold divergent opinions. This disparity arises from institutions feeling a lack of authority to actively respond to these disasters.

Furthermore, the role of the intermediary agency responsible for twenty-nine tourist attractions in Batu City is analyzed in terms of disaster management strategies related to tourism. The examination employs MACTOR to understand the roles and relationships among actors involved in addressing disasters. Figure 10 illustrates the analysis results, which reveal two quadrants depicting the roles and interdependencies among institutions. In Quadrant II, seven tourist attractions—Jatim Park 1, Jatim Park 2, Jatim Park 3, Museum Angkut, Predator Fun Park, Eco Green Park, and Batu Night Spectacular (BNS)—are identified. These attractions display a high level of reliance on other institutions, necessitating enhanced collaboration in their disaster management roles. The significant collaboration and influence observed among these seven tourist attractions may be attributed to their inclusion within the same business group, namely the Jatim Park Group, resulting in uniform policies.

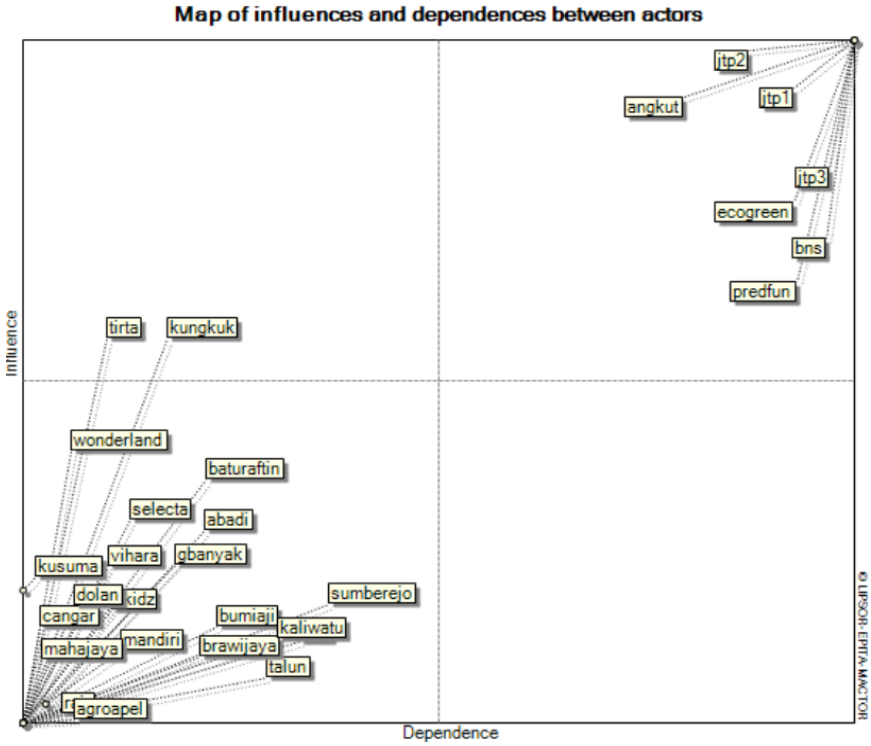


Figure 11. Map between Tourism Object Institutions (Actors) Playing a Role in Disaster Strategy in the Batu City Tourism Area

Based on Figure 11, it can be observed that 22 objects tour each other in Quadrant IV, indicating that these objects have minimal influence on coping strategies for disasters and low reliance on institutional support from the quadrant. This suggests that tourism within this quadrant does not significantly contribute to the disaster treatment strategy in the Batu City Tourism Area. The reason for this low contribution is likely due to the lack of coordination among the tour objects in Batu City, where there are no directives, rules, or standard policies governing tourism activities.

In the Batu City Tourism Area, tourism businesses are primarily focused on disaster strategies and Standard Operating Procedures (SOPs). This can be seen from the interviews conducted with various tour objects in Batu City, including Batu Rafting, Coban Talun, Coban Rais, Kaliwatu Rafting, and Hot Springs Cangar. However, other tour objects do not prioritize disaster strategies and SOPs as their locations are less susceptible to disasters or have rarely experienced them. Nonetheless, these tour objects with lower susceptibility have still implemented disaster mitigation SOPs and received disaster training from the local BPBD (Regional Disaster Management Agency). The management of COVID-19-related disasters is a key focus for all tour objects in Batu City, and they adhere to recommended rules and protocols provided by the Central and Regional Governments. The impact of COVID-19 on tourism in Batu City has had varying effects. Larger tour objects have experienced a small-scale impact on their operating hours, while smaller tour objects have been temporarily closed, resulting in staff reductions. However, there have been no reported casualties.

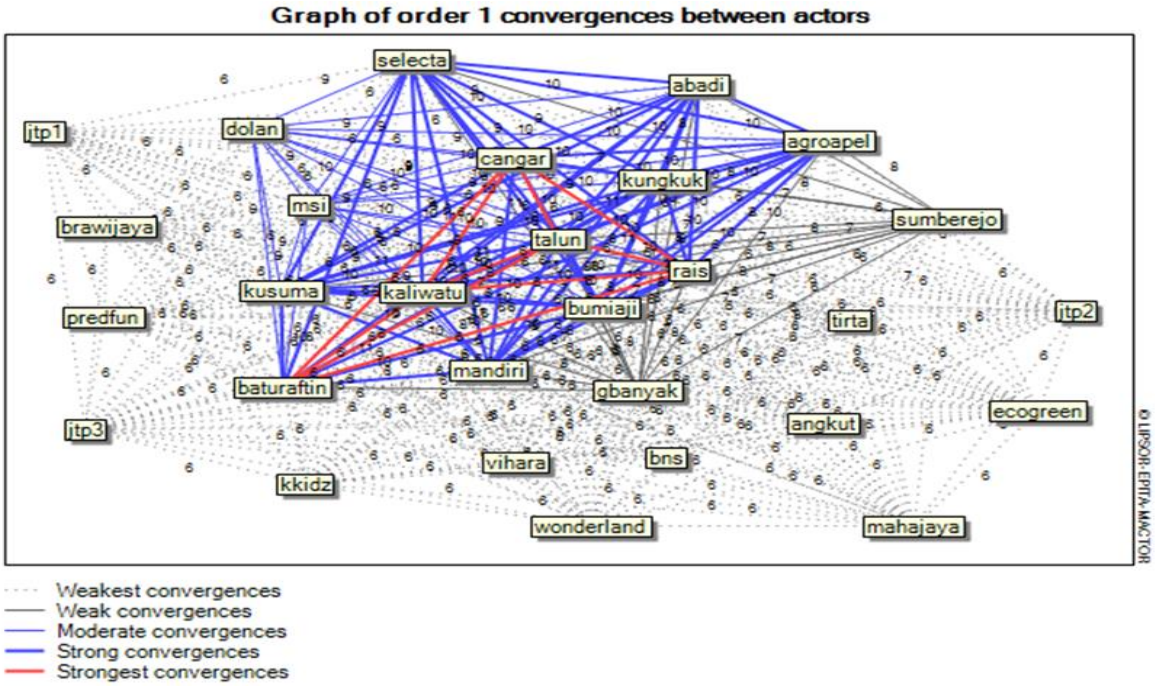


Figure 12. Map of Convergence Between Institutions of Tourism Objects (Actors) that Play a Role in the Disaster Strategy in the Batu City Tourism Area

The map in Figure 12 demonstrates the convergence of institutions within the Batu City Tourism Area as a result of MACTOR analysis, highlighting their potential for collaborating in managing disasters within the tourism sector. Among the various tourist attractions depicted, such as Batu Rafting, Coban Talun, Coban Rais, Kaliwatu Rafting, and Hot Springs Cangar, these five attractions stand out as having high potential for cooperation. They share a common characteristic of utilizing natural resources, particularly the Brantas River, which exposes them to a higher susceptibility to risks compared to other tourist attractions. The swift current of the Brantas River serves as a focal point for formulating, developing, and implementing disaster standard operating procedures (SOPs) for these attractions.

1DAA	tirta	gbanyak	sumberejo	rais	cangar	selecta	bumiaji	talun	abadi	mandiri	kungkuk	vihara	mahajaya	brawijaya	baturaftin	msi	kaliwatu	agroapel	jtp1	jtp2	jtp3	wonderland	angkut	bns	ecogreen	Kkidz	dolan	predfun	kusuma
tirta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
gbanyak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sumberejo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
rais	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cangar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
selecta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bumiaji	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
talun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
abadi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mandiri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
kungkuk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
vihara	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mahajaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
brawijaya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
baturaftin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
msi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
kaliwatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
agroapel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
jtp1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
jtp2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
jtp3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
wonderland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
angkut	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ecogreen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
kkidz	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dolan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
predfun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
kusuma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of divergences	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Figure 13. Divergence Values Between Tourism Object Institutions (Actors) that Play a Role in the Disaster Strategy in the Batu City Tourism Area

Figure 13 illustrates the significant differences in the approach taken by various institutions regarding the management and response to disasters in the Batu Tourism Area. There is a lack of cohesive efforts and conflicting interests when it comes to executing strategies and dealing with disasters. The implementation of disaster management strategies across different tourist attractions lacks coordination and each location only applies limited standard operating procedures (SOPs) specific to that particular site.

3MAO	pra-c19	saat-c19	pasca-c19	pra-klh	saat-klh	pasca-klh	pra-kkrg	saat-kkrg	pasca-kkrg	pra-bjr	saat-bjr	pasca-bjr	pra-lgs	saat-lgs	pasca-lgs	Mobilisation
tirta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
gbanyak	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sumberejo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
rais	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
cangar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
selecta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
bumiaji	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
talun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
abadi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mandiri	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
kungkuk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
vihara	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mahajaya	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
brawijaya	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
baturaftin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
msi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
kaliwatu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
agroapel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
jtp1	0.0	11.6	7.8	3.9	3.9	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	34.9
jtp2	0.0	11.6	7.8	3.9	3.9	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	34.9
jtp3	0.0	11.6	7.8	3.9	3.9	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	34.9
wonderland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
angkut	0.0	11.6	7.8	3.9	3.9	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	34.9
bns	0.0	11.6	7.8	3.9	3.9	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	34.9
ecogreen	0.0	11.6	7.8	3.9	3.9	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	34.9
kkidz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
dolan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
predfun	0.0	11.6	7.8	3.9	3.9	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	34.9
kusuma	0.0	5.5	3.7	1.8	1.8	1.8	0.0	1.8	0.0	1.8	0.0	0.0	1.8	1.8	1.8	23.9
Number of agreements	0.0	87.0	58.0	29.0	29.0	29.0	0.0	1.8	0.0	29.0	0.0	0.0	1.8	1.8	1.8	
Number of disagreements	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Degree of mobilisation	0.0	87.0	58.0	29.0	29.0	29.0	0.0	1.8	0.0	29.0	0.0	0.0	1.8	1.8	1.8	

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Figure 14. Divergence Values Between Tourism Object Institutions (Actors) that Play a Role in the Disaster Strategy in the Batu City Tourism Area

An analysis was conducted on the most active tourist destinations to determine the effectiveness of disaster coping strategies. Figure 14 illustrates this analysis using the 3MAO matrix. The results indicate that the Jatim Park Group, comprising Jatim Park 1, Jatim Park 2, Jatim Park 3, Predator Fun Park, Angkut Museum, Batu Night Spectacular (BNS), and Eco Green Park, has the highest level of mobilization when implementing disaster coping strategies. These tourist destinations play a significant role in achieving the objectives of disaster strategy implementation, covering the pre-disaster, during-disaster, and post-disaster phases, with a value of 34.9. The Jatim Park Group has well-designed programs and activities aimed at mitigating and managing disasters in the region. Additionally, Kusuma Agrotourism also exhibits substantial mobility in coping strategies for the disaster tourism business, with a value of 23.9. This indicates that Kusuma Agrotourism has relevant programs and activities associated with disaster strategies in the region. Furthermore, the analysis reveals that managing COVID-19 has become a primary focus in actively handling disasters across all tourist destinations, with a value of 87.

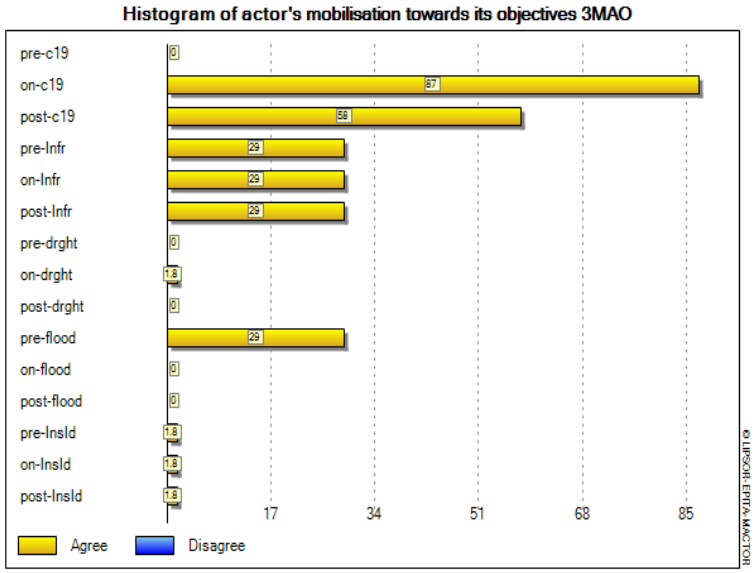
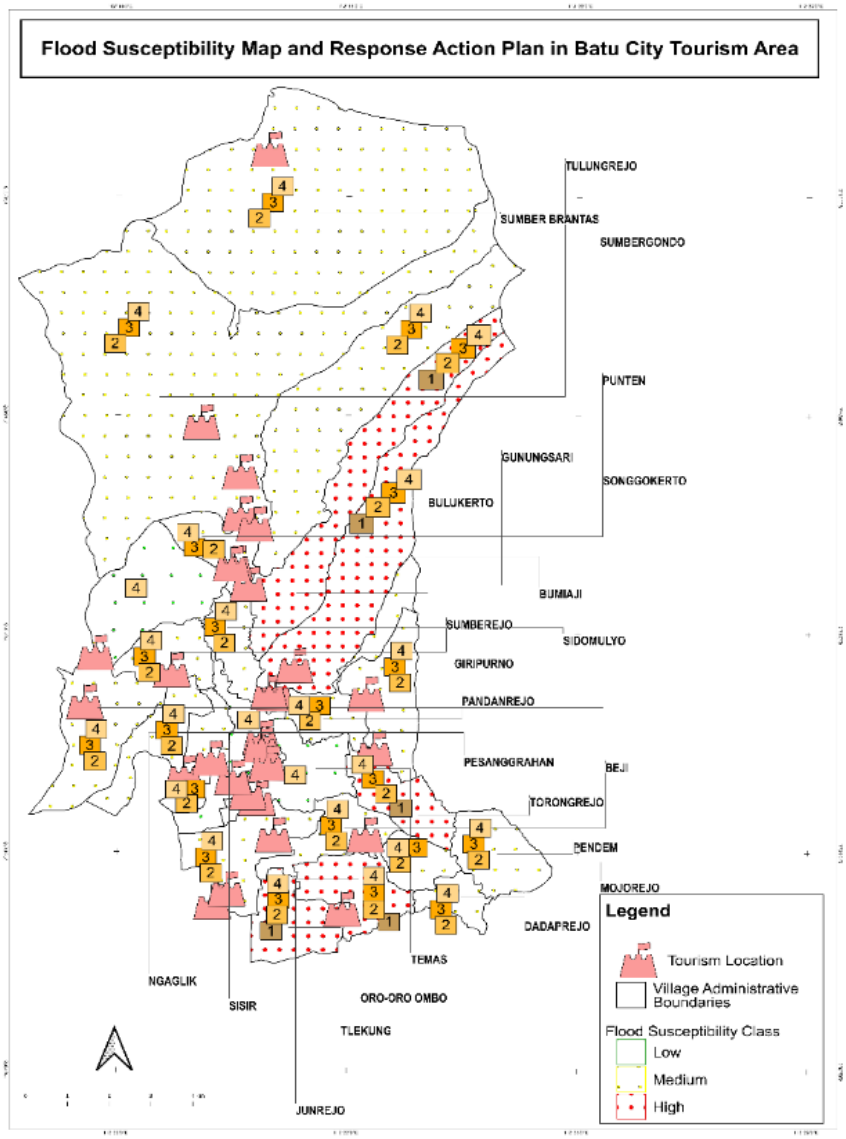


Figure 15. Histogram of the Achievement of Batu Tourism Object Goals on Disaster Handling Efforts

If we analyze the achievement objective, we can observe institutions using a 3MAO matrix and the histogram depicted in Figure 15. The histogram illustrates the levels of mobility and approval (pro) regarding the implementation of different disaster strategies in the context of tourism. The results reveal that 29 tour objects (all observed tours) agree (pro) and support the efforts in managing various disasters, including the pre-and post-COVID-19 disaster, pre- and post-flood disaster, pre- and post-landslide disaster, pre- and post-fire disaster, and pre-and post-drought disaster. On the other hand, some tourism objects hold contrasting views (contra) on how to handle floods, landslides, fire, and drought disasters. Several additional plans can be devised to address the susceptibility to specific threats.

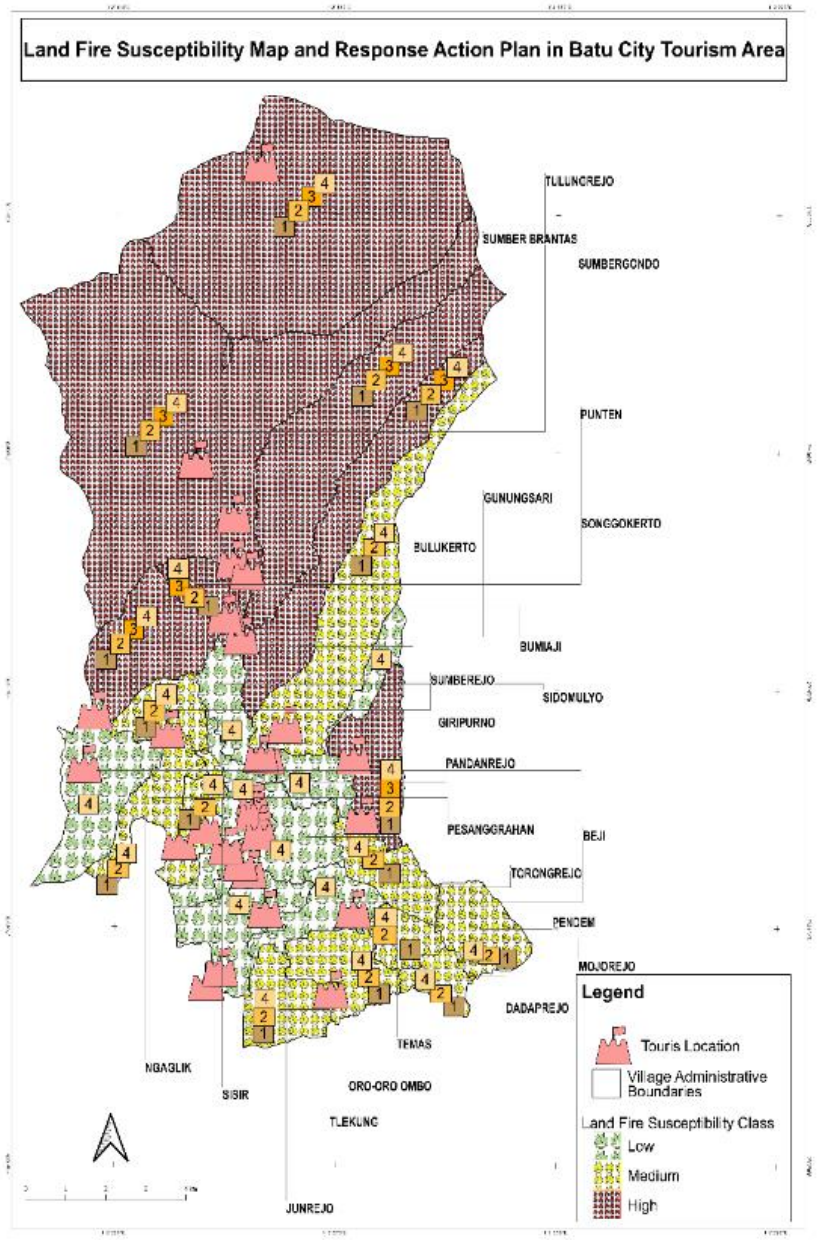
The studied disasters are shown in Figure 16-20. Figure 16-20 shows the action plan that will be carried out by each regional organization (OPD) that has responsibility for the disaster events observed in the study. The action plan to be carried out is presented in each table below the map image. The action plan given is based on the type of disaster that occurred and the institutions involved in the follow-up plan, for example in a flood disaster, an action plan is in the form of post-disaster rehabilitation and reconstruction which is needed as a result of the damage that occurred when the flood disaster hit. The next example is when the COVID-19 disaster occurs, the health office requires an action plan in the form of building or increasing the capacity of a hospital in anticipation of a sudden return of COVID-19 with a very high number of sufferers.



Code Description:

Code	Activity	Institution
1	Post-disaster rehabilitation and reconstruction	BPBD
2	Revegetation	Environmental Service Life
3	Dissemination of waste management	Environmental Service Life
4	Maximizing disaster risk management forums	Universities and BPBD

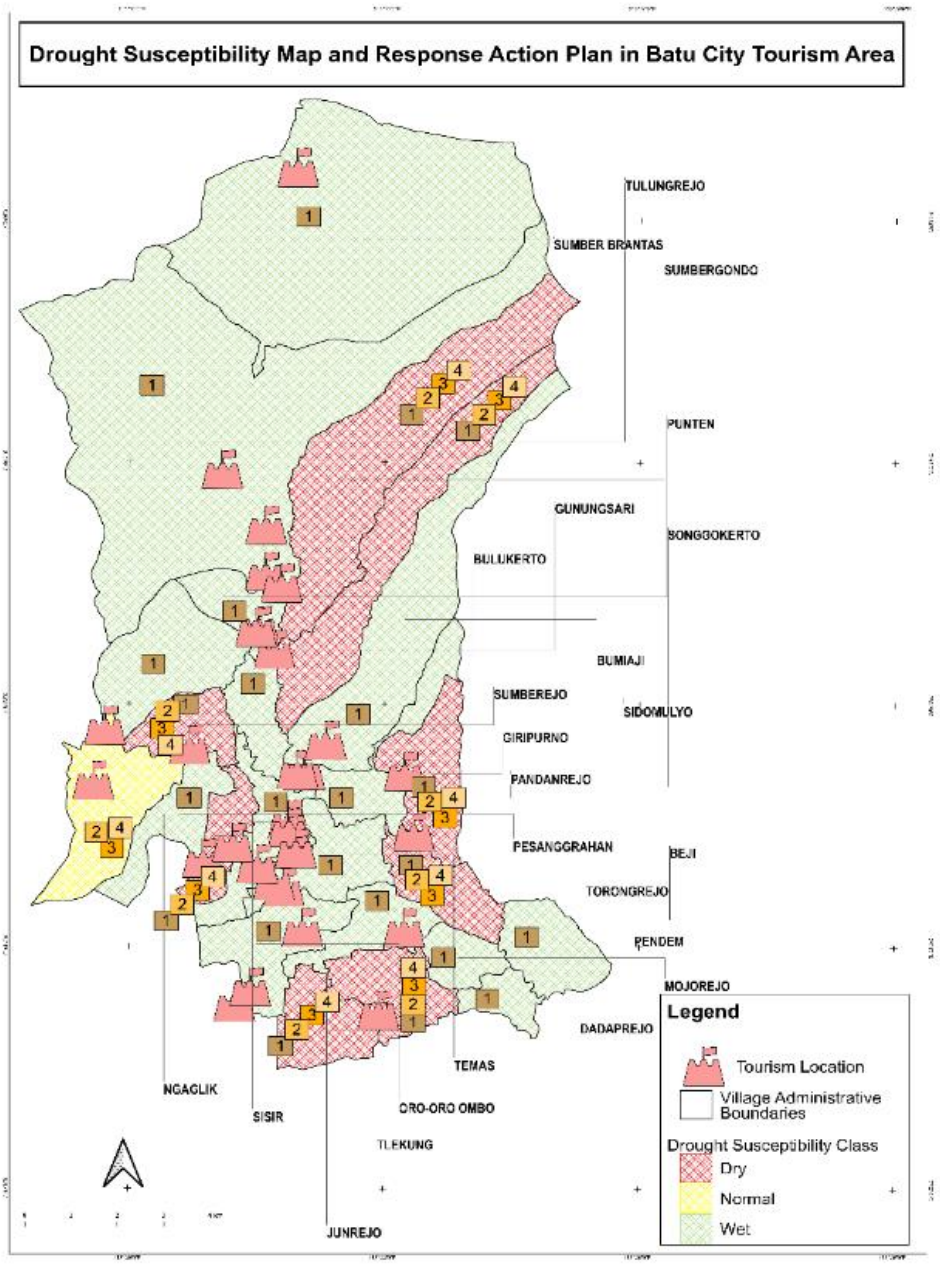
Figure 16. Map of the Flood Disaster Management Plan According to the Results of Influence Analysis between Actors and Distribution of Flood Susceptibility



Code Description:

Code	Activity	Institution
1	Dissemination of land fire emergency response	BPBD
2	Maximizing disaster risk management forums	Universities dan BPBD
3	Buffer zone development	BPBD
4	Land fire early warning system development	BPBD

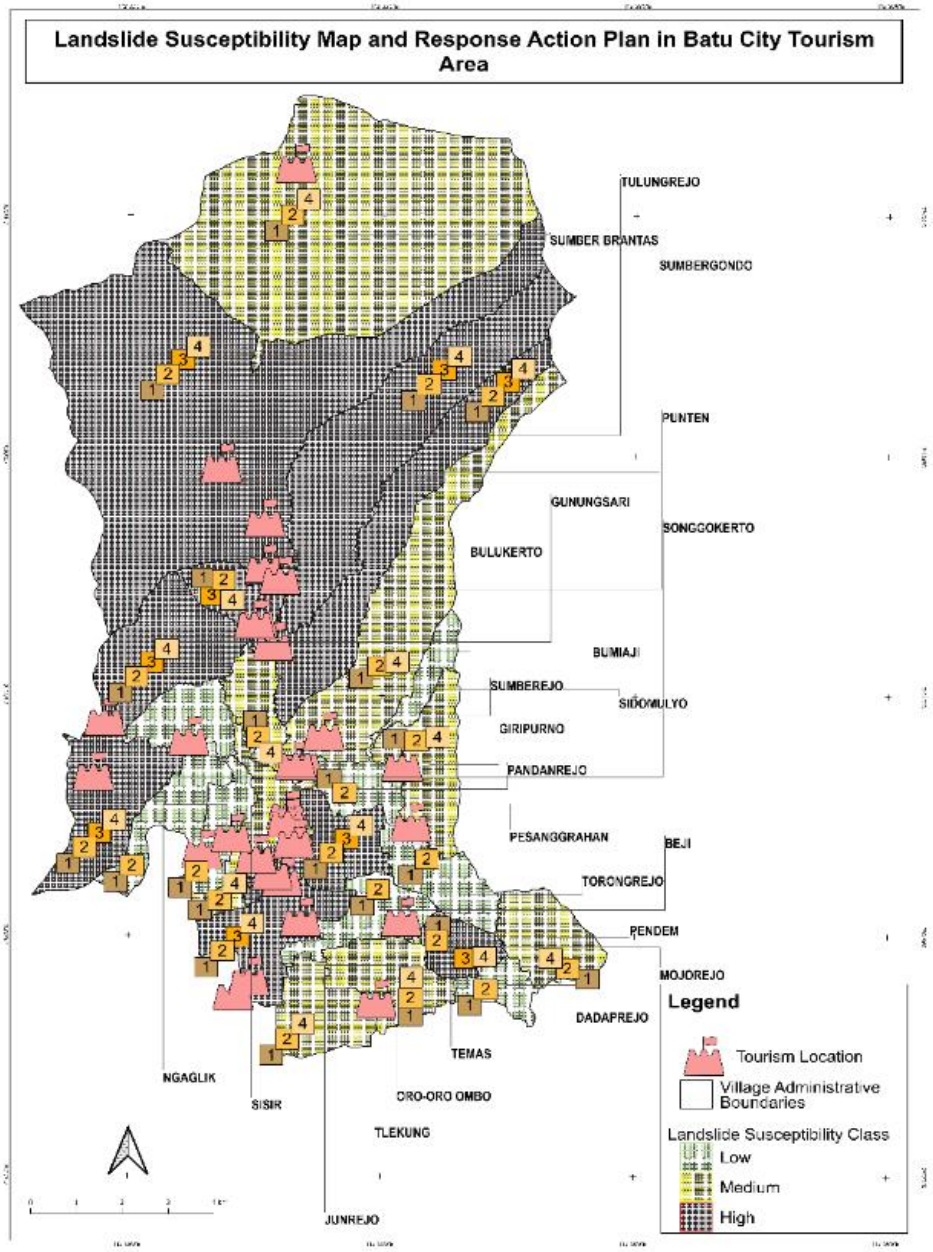
Figure 17. Map of Land Fire Disaster Management Plan According to the Results of Influence Analysis between Actors and Distribution of Land Fire Disaster Susceptibility



Code Description:

Code	Activity	Institution
1	Development of supply chain synergy	Batu City Regional Government
2	Construction of irrigation canals	Bappeda
3	Revegetation and improve area water absorption	Environmental Service Life
4	Making a reservoir (pond)	Bappeda

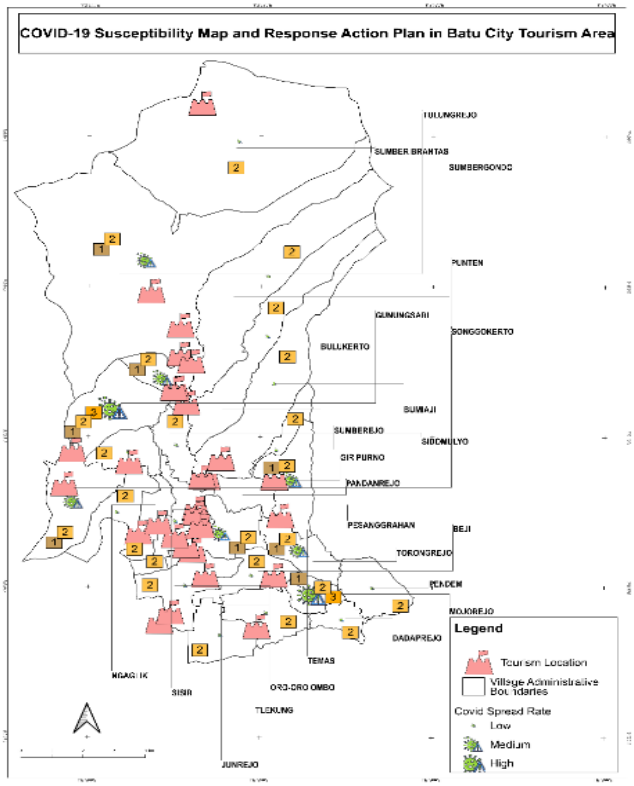
Figure 17. Map of the Drought Disaster Mitigation Plan According to the Results of Influence Analysis between Actors and Distribution of Drought Disaster Susceptibility



Code Description:

Code	Activity	Institution
1	Residential arrangement	ATR/BPN
2	Revegetation	Environmental Service Life
3	Drainage system improvement	Ministry of PUPR
4	Disaster evacuation route	BPBD

Figure 18. Map of the Landslide Disaster Management Plan According to the Results of Influence Analysis between Actors and Distribution of Landslide Disaster Susceptibility



Code Description:

Code	Activity	Institution
1	Socialization of health protocols	Health Office
2	Hospital capacity building	Health Office
3	Provision of cleaning facilities	Sanitary Agency

Figure 19. Map of the COVID-19 Disaster Management Plan According to the Results of the Influence Analysis between Actors and Distribution of the COVID-19 Disaster Susceptibility

The Relationship between Disaster Management Strategy and National Defense

Analysis of the actors involved in the disaster management strategy as described in the previous paragraph is an important basis for building national defense. Disaster management is of utmost importance due to the critical need for prompt and accurate actions, which significantly impact the effectiveness of handling a disaster. The urgency for community and agency preparedness in disaster management is crucial for early response to such events. In terms of defense, the regulations and policies in Indonesia explicitly state that defense objectives encompass not only sovereignty and territorial integrity but also the safety of the entire nation and its people. This reflects Indonesia's adherence to the concept of traditional/territorial security, focusing on national defense against military threats and territorial sovereignty, as well as the concept of human security against all forms of threats. The escalating frequency of natural disasters in Indonesia poses a tangible threat to national security, endangering the lives and well-being of its population. Furthermore, these natural disasters can also have socio-economic ramifications, as seen in the case of Batu City. Consequently, the Indonesian

National Armed Forces (TNI) have been involved in emergency disaster response operations.

Action plans that are formed for each disaster about disaster management strategies can be carried out in coordination with the TNI, where the TNI has personnel who are trained and ready to respond quickly to natural disasters. They can assist in the evacuation of affected residents, provide emergency medical assistance, and provide logistics and basic equipment for disaster victims. TNI can help secure the disaster area so that aid can enter smoothly and prevent acts of looting. They also have strong logistical capabilities to distribute aid to remote, hard-to-reach areas. The TNI can provide training to the community on initial disaster management, proper evacuation, and other safety measures. This is important for increasing community preparedness for disasters. In some cases, the TNI may engage in joint operations with multiple parties including the police, the National Disaster Management Agency (BNPB), and other agencies to coordinate a comprehensive disaster response. In recent years, Indonesia has experienced several major disasters and the TNI has been involved in response and recovery efforts. However, it should be noted that the TNI's involvement in disaster management also requires good coordination with civilian parties and pays attention to human rights principles in its implementation.

The Indonesian defense concept emphasizes safeguarding territorial sovereignty and national security. As the risk and intensity of future natural disasters increase, the safety of the Indonesian people becomes a genuine concern. By enhancing preparedness for such calamities, the involvement of the TNI in disaster response activities will become more pronounced. Consequently, there is a need for defense equipment support to bolster the capabilities of the TNI's disaster response units. It is essential to reassess the strength and requirements of defense equipment, troop readiness, and the potential for increasing the national defense industry's capacity, given the high likelihood of future natural disasters. The expansion of industrial capacity should be driven by military necessity, the actual threats faced, and product diversification, while also considering opportunities and trends in the global market. As a result, it is anticipated that this approach will have a dual impact on the national economy and state defense (Irfiansyah, 2019).

CONCLUSIONS, RECOMMENDATIONS, AND LIMITATIONS

Disaster management is an important issue of national defense. Based on this research, the role of actors in improving disaster management in tourism areas in Batu City is very crucial, especially BPBD and DLH as actors who influence other actors on strategy and disaster management in Batu City. The role of actors in disaster management through risk mapping, preparing emergency response plans, and involving the community in prevention efforts are important actions in disaster management. The success of these efforts will contribute to overall national security and stability. Cooperation between regional actors and national defense agencies to coordinate emergency response efforts, such as evacuation, medical treatment, and distribution of aid in disaster situations is important in responding quickly and effectively to save lives and protect critical infrastructure. National defense often has access to classified information and intelligence relevant to disaster mitigation, so that it can enable important information exchange, including risk analysis, situation monitoring, and early warning of potential threats. In dealing with widespread disasters, disaster management implementing actors may need assistance from national defense agencies in terms of resources and logistics. For example, the armed forces may provide transport assistance,

helicopters, and additional personnel to assist in the evacuation or distribution of aid. Effective collaboration between the two fields can strengthen the country's ability to face the challenges it faces, as well as minimize the impact caused by natural and man-made disasters.

For recommendations to enhance national defense, the government of Batu City should prioritize the following actions. Firstly, strengthen disaster knowledge management by integrating data, maps, information, and knowledge at all levels. Secondly, revise the Spatial Plan for Batu City and create detailed spatial plans for villages, urban villages, and sub-districts, considering the analysis of disaster risks in each area. Developing a disaster susceptibility index in collaboration with relevant institutions should be a priority to inform planning policies and mitigation activities. Active participation from the community, universities, and local stakeholders is crucial, requiring outreach efforts, literacy programs, education initiatives, and the implementation of safety procedures. Collaboration with universities and effective coordination among government agencies and community leaders are necessary. Additionally, research household and community-level disaster behavior, focusing on social capital and resilience during different periods. This knowledge will aid in formulating inclusive assistance and social protection measures for vulnerable groups. Finally, develop specific policies to mitigate landslides and address challenges posed by the COVID-19 pandemic in urban villages.

The recommendation to enhance national defense and disaster management in Batu City encounters several limitations. To begin with, financial constraints present a hurdle as the proposed measures necessitate substantial funding for multiple initiatives. Inadequate expertise and capacity in disaster management, spatial planning, research, and community outreach can impede successful execution and can also be a limitation factor. Moreover, coordination among institutions may prove challenging due to bureaucratic processes and disparities in organizational cultures. Opposition from influential groups or individuals and political considerations can hinder progress. Lastly, external factors such as new disasters or political instability can affect the implementation.

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