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## *Sub Theme: Disaster Mitigation in the Society 5.0*

# The Complexity of Abrasion Disaster Mitigation on Rupat Island

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**Abstract**

Abrasion disasters and environmental issues are strategic issues that are widely studied from various study perspectives, this article is the result of research conducted by researchers from the perspective of public administration. The Abrasion Disaster on Rupat Island is a disaster that can cause various social and economic impacts on the community. In 2019, the abrasion rate on Rupat Island reached 6-8 meters. Rupat Island is also one of the outer islands of Indonesia which borders with neighbouring countries, namely Malaysia and is included in the National Tourism Strategic Area (KSPN). Therefore, the abrasion disaster that occurred on Rupat Island, Bengkalis Regency must be managed in order to minimize the impact of theabrasion disaster that occurred. Abrasion disaster management can be done one of them by means of abrasion disaster management or efforts made to regulate the reduction of abrasiondisaster risk. The purpose research is to know abrasion disaster management actors in Rupat Bengkalis and determine what course the limitations in disaster management abrasion in Rupat Bengkalis. This type of research is qualitative research using data collection methods through interviews and documentation. The findings in this study is that the management effort abrasion disaster in Rupat actor countermeasures abrasion in Rupat not maximized This is caused by things still are limitations in disaster management is done. The value in this study is that disaster management actors at the regional and central levels cooperate with each other in order to maximize disaster management efforts

**Keywords:**

disaster mitigation; abrasion disaster; disaster management; risk reduction

## Introduction

Rupat Island is the outermost island in Riau Province, with a strategic coastal area because it is directly opposite neighboring Malaysia. On the other hand, Rupat Islandforces the local government and the central government to have extra attention, this is because, it is a critical coastal area because it is eroded by abrasion every year. (Rahmat Hidayat, 2014). The uniqueness of Rupat Island is the National Coastal Strategic Area (KSPN) which

experiences severe abrasion every year, but quantitatively in 2019 the length of abrasion on Rupat Island reached 6 -8 meters. (BWSS III Pekanbaru, 2021).

Abrasion is a natural disaster that requires special, serious and appropriate attention by the local government and also the central government because the abrasion disasteron Rupat Island has a socio-economic impact on the community. (Rahmat Hidayat, 2014). The social and economic impact of abrasion, ideally, requires special attention from the local government by seeking appropriate abrasion disaster management according to the characteristics of the abrasion that occurred on Rupat Island.

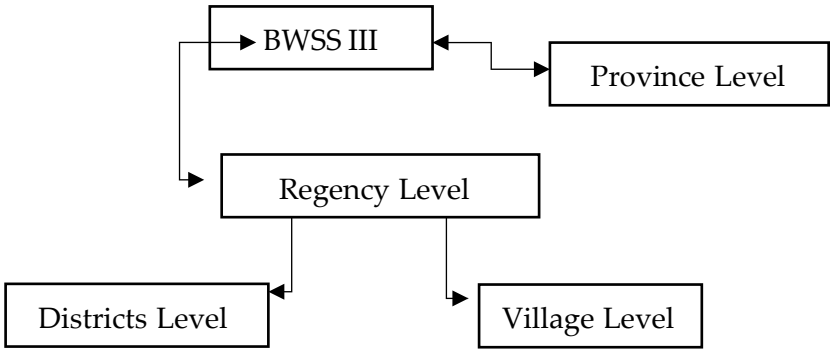
Disaster management is an effort to minimize the impact of a disaster that is supported by planning before the disaster occurs, when a disaster occurs or after a disaster (Soehatman, Ramli 2010). This impact reduction is carried out by disaster management actors starting before the disaster occurs, is happening and after the disaster occurs. Disaster management is carried out with a pattern of structural development and non-structural development. The construction of structures and non-structural developments is the result of the coordination process between actors in the management of abrasion disasters. (Soehatman, Ramli 2010).

Rupat Island is included in the Strategic Development Area (WPS). Ensuring regional-based infrastructure with strategic development is the task of the Ministry of Public Works and Public Housing (PUPR) through the Regional Infrastructure Agency (BPIW) regulated in Presidential Regulation No. 15 of 2015.

The Sumatra River Region III (BWSS III) Pekanbaru City is a representative of the Ministry of Public Works and Public Housing (PUPR) at the provincial level, tasked with handling abrasion disasters on Rupat Island. BWSS III carries out abrasion disaster management, through coordination between actors in the Village to related Regional Apparatus Organizations.

**Figure 1.**

**Roles of coordination of actors for Abrasion in Rupat Island**




Based on Figure I, it can be seen that the ideal coordination pattern must be carried out in the abrasion disaster coordination pattern. however, the complexity of planningand realization as well as the focus of development needs are limitations. collaborationat the district government level, namely the Bengkalis Regency BAPPEDA, the Bengkalis Regency Environmental Service and the PUPR Office. At the district government level, it is also acknowledged that currently the Bengkalis Regency, especially on Rupat Island, Bengkalis Island and several sub-districts located in mainland Riau, are under construction, and it is impossible to focus solely on abrasion.high-cost abrasion management, while the district is still fixing its infrastructure, personnel expenditures and other development sectors

This article will show the complexity of abrasion disaster management on Rupat Island. Abrasion disasters are different from disasters in Riau Province such as the Haze. The complexity that arises between development priorities, communication between actors and classic problems in the budget becomes the grassroots in the abrasion disaster. on the other hand, the higher the abrasion especially the peat soil structure.

## Methods

Through qualitative research methods, by examining the condition of objects naturally and emphasizing research results on the meaning of the actual data (Sugiyono, 2014). Primary and secondary data were obtained through interviews, observation and documentation. The primary and secondary data were analyzed using the Interactive Analysis Model system. This analysis system starts from data collection, data reduction, data presentation and conclusion drawing.

The author involves all the actors in Figure I, as the primary data source and a number of secondary data obtained from the actors in the abrasion disaster management. thereare some limitations of the author in terms of analysis, a number of invalid data because the budget posture of each actor is different. and the non-disclosure of the exposure of each actor related to their respective functions, this has not yet reached the pattern of coordination carried out.

## Results and Discussion

The complexity of abrasion disaster management is of particular concern, in this article. This article is the result of research related to abrasion disaster management in Bengkalis Regency, namely Rupat Island. begins by looking at the abrasion disaster mitigation that has been carried out. Usually, if a disaster occurs, it will be the responsibility of the regional disaster management agency (BPBD Bengkalis Regency).Abrasion disaster, is not a disaster with human victims, but human life in the future will be very influential. and BPBD is not the central actor for Abrasion Disasters like disasters in general.

There are three stages in disaster management that should be fulfilled, such as the first stage, namely before a disaster occurs in the form of preparedness, mitigation and early warning. The second stage is when a disaster occurs and the third stage is post-disaster by conducting rehabilitation and reconstruction (Soehatman, Ramli 2010). The ideal disaster management is to prepare a layout for these three stages, but as in the previous paragraph, abrasion disaster management is different from other disasters. regardless of the stage of a disaster, interpreting an abrasion event is certainly very difficult to interpret because it occurs naturally.

The number of agencies which means multi-actor plays a very important role here, and the key point in the management of abrasion disaster is very heavy on the disaster mitigation department. In the pre-disaster stage, BWSS III mostly carried out preparedness actions. Preparedness stages such as collecting secondary data by BWSSIII in coordination with the sub-district and village parties, related to the abrasion thatoccurred. Community characteristics certainly affect the rate of abrasion, especially ifMangrove plants do not support it naturally.

In general, coastal structures in Riau have the characteristics of peatlands. Abrasion

that occurs on peatlands is much faster than on non-peat soils. Based on the data, theeastern coast of Rupat Island is directly opposite the Malacca Strait. Every year there is an abrasion of 2-3 meters per year (BWSSS III, 2021). Geographically, it is also facingthe South China Sea, which allows currents for natural abrasion to occur.

Abrasion disaster mitigation, carried out to minimize the impact of abrasion disaster. Abrasion Disaster Mitigation is carried out by BWSSS III Pekanbaru City, the most basic stage is protecting the coast. Coastal protection is carried out by, based on recommendations from the sub-district and village government. The form of coordination carried out in mitigating the abrasion disaster was carried out by BWSSS III Pekanbaru City through Vertical coordination with the Ministry of Public Works and Public Housing (PUPR). Horizontal communication is carried out with local government to village levels.

Budget-based planning is very important and has the power to be carried out with a pattern of vertical coordination between actors. Coordination is carried out vertically between the central and regional governments, this is because it is realized that in carrying out abrasion disaster mitigation it requires large costs. for the last eight years for the prevention or mitigation of abrasion disasters that have been carried out have spent Rp. 326,575,506,736,. Rupat Island administratively has two sub-districts, from these two sub-districts there are 9 coasts with critical categories for abrasion achievement.

The construction that has been built in an effort to mitigate the disaster, which also indirectly becomes the rehabilitation stage for the abrasion disaster in Rupat Island and Bengkalis Regency as a whole. the following data obtained from BWSSS III Pekanbaru City.

**Table 1.**

**Construction Abrasion Disaster Mitigation**

| No | Construction | Description |
|---|---|---|
| **1** | Break Water from Stones | 1. As a breakwater. Naturally helps in strengtheningMangrove plants. Because Mangroves are natural plants that are able to prevent or slowdown abrasion |
| **2** | Sedimentation | 2. Sedimentation is carried out in the form of planting mangroves, planting that is carried out intentionally to fillbreakwaters and form natural mitigation patterns from coastal plants. |

*Source: Bengkalis Regency Government, 2021*

The first construction, namely the breakwater, is very expensive. especially abrasion occurs almost along the coast.

Horizontal coordination carried out by local governments is realized in the form of preventive activities only. Because, abrasion disaster mitigation requires action with careful planning and preparation in line with regional development. The limitations of the regional budget and indeed the situation in the area in Bengkalis Regency is in dire need of attention.

Horizontal coordination carried out by local governments is realized in the form of preventive activities only. Because, abrasion disaster mitigation requires action with careful planning and preparation in line with regional development. The limitations of the regional budget and indeed the situation in the area in Bengkalis Regency is in dire need of attention. The abrasion disaster mitigation pattern that is carried out is by bit by bit. A number of proposals submitted cannot be carried out directly, so they are carried out partially.the effect is that the abrasion continues, but of course it is not in accordance with the current planning and abrasion conditions.

## Conclusion

Abrasion Disaster Mitigation, in Bengkalis Island is very complex in terms of the need for critical land that has been eroded very widely. The dependence of the vertical coordination pattern is very high, but of course Rupat Island is not the main focus of the central government. The local government does not make abrasion disaster mitigation the main focus, because the district government's development priority is in infrastructure development. the mitigation efforts carried out require high costs, and have not presented the right mitigation pattern because they are carried out partially while the rate of abrasion increases every year.

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# The Urgence of Disaster Applications in The Era of Community 5.0

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## Abstract

People have been familiar with applications since the introduction of computers as a tool in completing work, whether in offices, companies and other businesses, where applications are now not a rare item because almost all people have smartphones. The Inarisk Disaster Application and BMKG Info that have been issued by BNPB and BMKG is an application that can be accessed by the general public to find out the possible places where disasters will occur around us, both natural and non-natural disasters. Indonesia is one of the countries that is very prone to disasters where Indonesia has several tectonic plates and is also traversed by the ring of fire zone which is very susceptible to various kinds of disasters so that a breakthrough is needed in making applications that can be connected and accessible to the public, not only those who have smartphones. live in urban areas but people live in remote areas. The government's efforts in realizing a more comprehensive disaster application need to be realized immediately because society is currently moving towards society 5.0. where all work and activities are supported by application-based technology, in addition to the existence of disaster applications, it means that the community and government can carry out early detection and prevention of possible disasters that will occur.

## Keywords:

disaster applications; government and society 5.0

## Introduction

Indonesia as one of the rich countries with abundant natural resources that we cannot necessarily find in other countries so that as Indonesian citizens we should be grateful for it. But on the other hand, apart from abundant natural resources, Indonesia also has several disasters, both natural and non-natural. the existence of several tectonic plates and traversed by the ring of fire which at any time can move and emit fire so that the Indonesian people must be more careful when traveling in other words, first seek accurate information about when and where a disaster will occur.

Natural and non-natural disasters such as earthquakes, landslides, volcanic eruptions and forest fires have become news that we often see and hear through electronic and print media, but in this digital era, we also cannot fully know when and where the disaster will

occur. will occur so that a disaster application is needed that can be a liaison to find out the possibility of a disaster.

Currently, in the digitalization era, several disaster applications can be found that are easily and accessible via smartphones or news from other electronic media. Indonesia currently has two disaster applications, namely the Inarisk application and BMKG info from the two disaster applications, of course it cannot be said to be perfect. However, the application can be a means of finding initial information related to disasters that will occur in the future so that they can make wise decisions before carrying out a trip or activity carried out outside the home or in other places that are not yet known whether the area is prone to disasters or not.

The Inarisk application was developed by the National Disaster Management Agency (BNPB) where this application system can detect potential disasters and can be accessed by the Regional Disaster Management Agency (BPBD) and the wider community. Inarisk is a web-based system and application that displays disaster risks in Indonesia. The information includes, disaster hazard information and what actions the community should take when a disaster occurs. For example, before and after a flood occurs, the community can know what actions to take. Not only that, Inarisk also utilizes basic information, such as base maps from the Geospatial Information Agency (BIG), hazard maps from data trustees, such as flood maps from the Ministry of Public Works and Public Housing (PUPR), landslide and volcanic maps from the Meteorological Agency. So, Inarisk combines three pieces of information, such as one hazard information, vulnerability information and capacity information whether the local government already has a disaster map or not, whether the local government has a disaster regulation or not.

BMKG Info is an application that has been launched by BMKG. Where there are several features provided such as earthquake notifications, weather early warnings, and actual information about BMKG. Users can get information about weather forecasts based on location. including earthquake information, although currently only earthquakes with a magnitude above 5 on the Richter scale will appear as notifications, equipped with the distance from the epicentrum to the user's location.

The existing applications, both InaRisk and BMKG Info, are applications that are very much needed by the community in the era of digitalization of society 5.0. is a must or must

have it because Indonesia is a country that has many disaster-prone areas, both natural and non-natural disasters.

## Methods

The method that the author uses is a qualitative method by collecting data and looking at existing reports both from print and electronic media as well as statements from several resource persons or experts so that they can provide additional data that can be included in this paper. According to Sugiyono in his book entitled Understanding Qualitative Research, that qualitative research methods are "Qualitative research is a process of inquiry about understanding based on separate methodological traditions; clear examination that explores social or human problems. The author constructs a complex, holistic picture, examines words, reports and details the views of native speakers, and conducts the study in a natural setting. (Sugiyono 2007).

**Results and Discussion**.

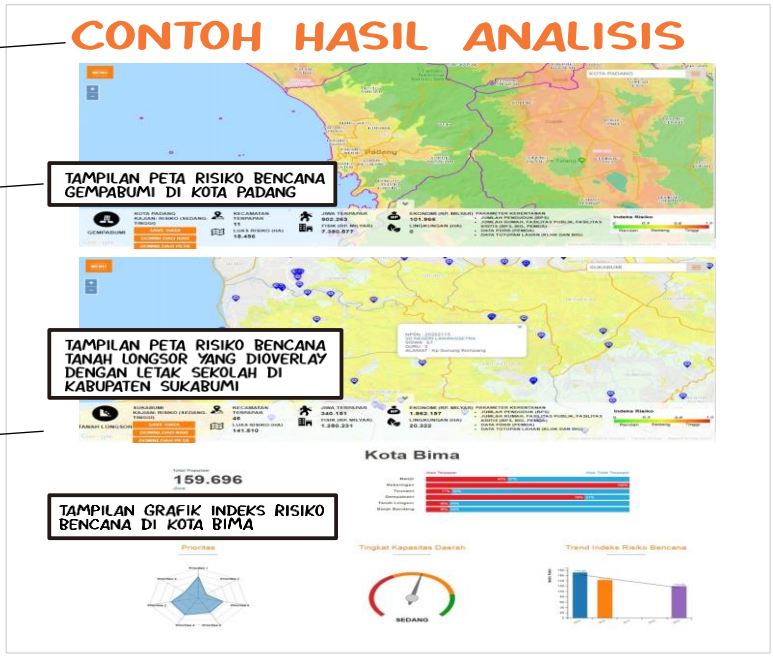
a. Inarisk application.

In the Inarisk Disaster Application, users can find out the risks of disasters that can occur in their area, such as floods, flash floods, extreme weather, extreme waves and abrasion, earthquakes, forest and land fires, droughts, volcanic eruptions, landslides, tsunamis, and multi-hazard disasters.

Districts or the number of sub-districts that use data from the Central Statistics Agency. The level of the study measured is based on several parameters, such as population, BPS data Number of houses, public facilities, critical facilities BPS data, BIG, Inarisk can also be used to determine the hazard index, vulnerability, and capacity of a type of disaster. The results will be known in the form of a digital map that is displayed in different color gradations according to the desired level of study. This map can be enlarged and reduced making it easier for users to know down to the detailed regional level. and Local Government GRDP data and local government data Land cover data KLHK and BIG In addition to knowing the study of a disaster in an area, this application also presents prevention and rescue measures that must be taken by the community if they are in an area that has a potential disaster.

In addition to the Disaster Application at Inarisk, currently there is also a Covid-19 hazard info application that is around people using the application.[1]

BNPB Inarisk Application Risk Map Analysis



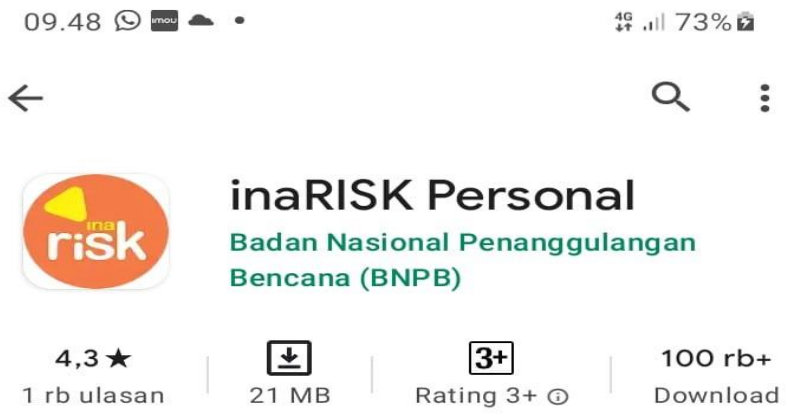

sample analysis results

map display of the earthquake risk of the city of Padang

display of the risk of landslides in the city of Sukabumi

Bima city disaster risk index graphic display

Community data using the BNPB Inarisk Aplication




[1]Guide to using Inarisk Booklet.CDR version

As for the number of Natural Disasters in Indonesia (1 January-18 June 2021), the National Disaster Management Agency (BNPB) noted, a total of 1,441 natural disasters that hit Indonesia from January 1 to June 18 2021. The most natural disasters were floods, with 599 incidents. Then a tornado with 398 events.

The Government's efforts in this case BNPB in creating and developing a Disaster application to determine the possibility of a disaster occurring are in line with several countries that have made a similar disaster application such as the United States, Japan, Netherlands and UAE. The existence of a disaster application such as Inarisk will be very useful for the Indonesian people and foreign nationals who will visit Indonesia.

From the data above, the author argues that most Indonesian people do not fully know areas that are prone to disasters, but with the existence of a disaster application made by the government, in this case BNPB, it has become a leap in the technology era. In order to be able to provide accurate information about possible disasters that can occur, the Inarisk application based on Android and Ios applications will greatly assist the government in providing disaster information to the community, both those who will carry out activities in other areas or around their homes in order to minimize the possibility of victims. both loss of life and material.

**b.** BMKG info application.

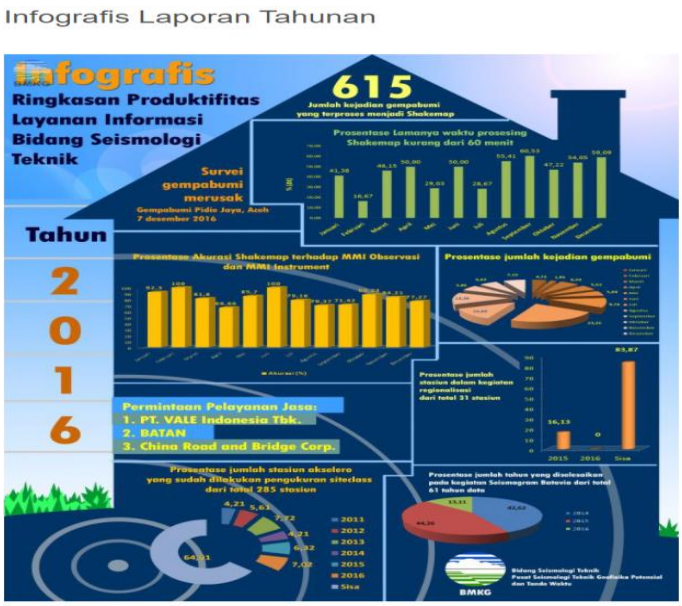
The BMKG info application as a means of communicating and providing information to the public is carried out through the internet network or in other words through the latest technology. The BMKG Info application is an application that can be used with an internet network on a wireless device or smartphone, Currently the need for weather information continues to increase in the face of the current uncertain weather so that BMKG as one of the institutions with an interest is called to provide the latest Android-based innovations for the community. In general, this application can help the public to get information about Indonesia's weather forecasts and early warnings of bad weather estimates of natural conditions, such as weather forecasts, air quality, climate, earthquakes, and so on related to meteorology, climatology, and geophysics.

Functionally, this application is not much different from other existing weather forecasting applications, but according to BMKG its weather information application can

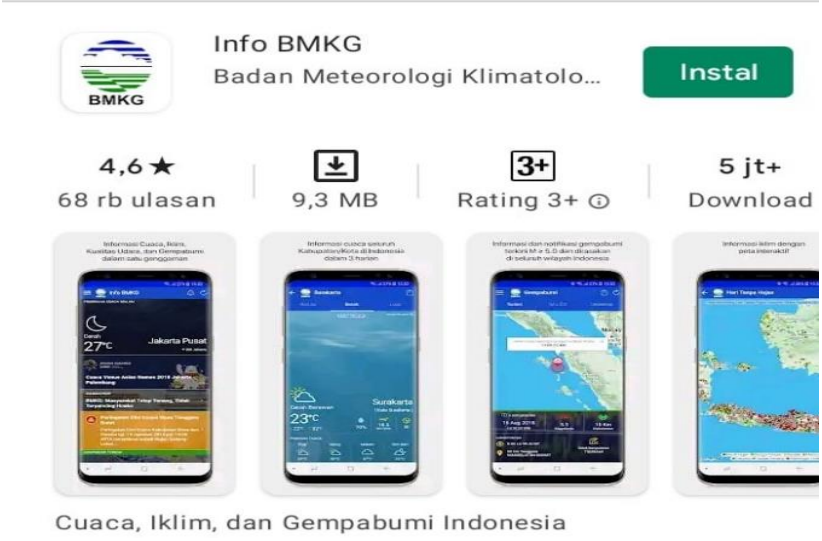
provide early weather warnings. The scale of the early warning information is not only limited to the province, but also to the sub-district level where you can find out the weather forecast in 7 days with forecasts every 3 hours per day in all sub-districts in Indonesia (BMKG, 2021).

BMKG Info Application Productivity Chart

annual report infographic. summary of the productivity of information services in the field of engineering seismology. (2016)




BMKG Info Application user data



The BMKG Info application has won the World Meteorological Organization (WMO) International Weather Award Apps Award 2020, which is a prestigious event for application developers engaged in the world's weather.

The author is of the opinion that with the BMKG information application created by BMKG, it can be accessed easily via smartphones, but there are still people who have not been able to access the application, even though Indonesia is currently in the era of society 5.0 which prioritizes digitizing information systems. This situation can be used as an evaluation material for the government in providing accurate information related to disasters despite the various obstacles and limitations that are currently being faced.

## Conclusion

All the efforts that have been made by the government by making a breakthrough by utilizing digitalization technology and information in the era of society 5.0. disaster app that At this time we need to appreciate even though there are advantages and disadvantages that need to be fixed immediately. There are two government institutions, namely BNPB and BMKG which have issued different disaster applications but the goal remains one, namely how the public gets information accurate information on the possibility of disasters that will occur in the future and how to prevent them so that the government in this case can take a measurable action against the possibility of casualties and material. But it can be seen from the data above the existing disaster application users are still very few.

For this reason, so that this disaster application is useful and can be accessed by the entire community, it is necessary to consider, namely (1) The need for the government to appoint a government agency that is more authorized according to applicable laws and regulations to issue a more complete disaster application according to the needs of the community. (2) The government needs to make a grand design that combines disaster-prone areas with areas that do not yet have an internet network. (3) The need for the government to create a rule that requires people to use disaster applications just like the protect care application required by the government if going to travel.

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**Website**

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