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*Original Research*

# Increasing Awareness of the Village Disaster Risk Reduction Forum in Magetan Regency in Realizing Disaster Preparedness

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**ABSTRACT**

Disaster risk reduction forums as a capacity in disaster resilient villages often experience difficulties in realizing disaster preparedness. It is necessary to prioritize any element that is immediately realized, so that what is done truly makes society have resilience and toughness. five disaster preparedness parameters that must be prepared by the forum. These five parameters have 25 elements as constructs. Elements as a construct of disaster preparedness parameters become an instrument called Difficulty and Usefulness of Elements in Disaster Preparedness (DUEDP-Questionnaire). This DUEDP questionnaire serves as a guide enumerator for interviewing forum administrators and communities in 23 disaster-resilient villages in the Magetan district. Data was collected for three months starting May-July 2023. The element prioritization technique uses the Quadrant of Difficulty and Usefulness (QoDU) method. This method focuses on elements in the upper left quadrant, namely elements that are very useful but how to make it happen is very difficult. The research results place the elements of involving vulnerable groups in socializing about disasters, providing village funds for disaster management, preparing contingency plan documents, providing early warning system tools, and training families to provide disaster preparedness bags as the main priorities that must be immediately realized by the forum.

**Keywords:** Forum; element; disaster preparedness

## Key Messages and Recommendations

Village disaster risk reduction forums face many obstacles in realizing community-based disaster preparedness. These constraints have an influence on community resilience in reducing disaster risks and resilience in facing disaster threats. This Policy Brief aims to provide solutions to village disaster risk reduction forums or similar capacities in realizing disaster preparedness by realizing priority elements as constructs of disaster preparedness parameters.

### *Recommendation*

Immediately carry out a participatory action review to realize the following activities:
1) Involve vulnerable groups including people with disabilities in outreach about disasters and early warning systems
2) Providing budget and infrastructure for disaster management
3) Carry out a village resilience assessment
4) Prepare a contingency plan document
5) Train each family in disaster-prone areas to provide disaster preparedness bags
6) Providing tools, ways to communicate and ways to respond to early warning systems
7) Facilitate disaster emergency response simulation training

# 1. INTRODUCTION

Natural disasters that will occur in East Java until 2022 include: earthquakes, volcanic eruptions, floods, landslides, drought, forest and land fires, extreme weather, the threat of tsunamis and extreme waves.[1] The most frequent disasters in Magetan district during the 2018-2023 period were floods, landslides, forest fires and drought.[2] The Magetan district disaster risk index assessment is categorized as medium. The achievement of this disaster risk index provides a warning to all disaster stakeholders in Magetan district to always be alert that disaster risks are always threatening. A form of vigilance is realizing community preparedness in disaster-prone areas to be resilient in facing disaster risks.

Realizing resilience and increasing community-based disaster preparedness is a form of action from the disaster risk reduction platform.[3] The substantial meaning of preparedness is increasing emergency response, easy access for the community in responding to early warnings, the ability of volunteers and capacity to mobilize resources and the ability of the community to take shelter if at any time there is a threat of danger. The change in the paradigm of disaster management from a reactive/responsive basis to a preventive basis, provides wider space for forums in community-based disaster risk reduction activities.

Disasters cannot be predicted with certainty, but the threat of disasters can be anticipated by implementing prevention, mitigation and preparedness.[4] The risk of disasters impacts damage to all life assets. The higher the potential exposure or threat and level of vulnerability, the higher the risk.[5] There are two main activities in disaster risk reduction, namely the prevention aspect by eliminating disaster risks, both reducing threats and vulnerabilities and the preparedness aspect in the form of realizing independence to be able and skilled in every action taken in facing disaster threats by increasing capacity.

The research results report that flood disasters are the type of disaster with the highest frequency in urban areas, while landslides and wind disasters are in rural areas.[6] It is estimated that the risk of flooding in urban areas will increase 2.7 times by 2030,[7] urban areas in Indonesia will be affected by flooding every year by 35%.[8] Globally, the increasing impact of flood threats in urban areas is due to high rainfall originating from climate change and accelerated urban expansion.[9] Likewise, landslides and wind disasters are the types of disasters with the highest frequency in rural areas. Geographically, Magetan district is located at an altitude of 660-1660 meters above sea level, has an area of 688.85 Km2, and a population of 670,810 people with a density of 913/Km2, consisting of 18 sub-districts and 235 villages. The climate in the Magetan district which is in the highlands has a temperature of around 16-20oC, while in the lowlands the temperature is around 22-26oC. The dry season is influenced by the easterly monsoon which is very dry and cold, while the rainy season is influenced by the westerly monsoon. Rainfall is more than 299 mm per month, with a rainfall frequency of between 90-140 times per year. Judging from geography, topography, climate and rainfall, the Magetan district is at risk of flooding, landslides, tornadoes and drought.

This Policy Brief was prepared based on the results of priority research on the construct elements of community-based disaster preparedness parameters. The method of prioritizing elements uses the Quadrant of Difficulty-Usefulness (QoDU).[10] This method focuses on efforts to realize preparedness for each preparedness parameter which is very difficult but has very high benefits. Using the QoDU method as an analytical approach in prioritizing elements based on the level of usefulness and level of difficulty is a new method in realizing community-based disaster preparedness. This method is a development of the Difficulty-Usefulness Pyramid (DUP) method.[11] The advantage of the QoDU method compared to other methods lies in the priority scale based on the quadrant distribution of each element, so that which elements need to be immediately repaired or implemented is clearer.[12]

There are five components of disaster preparedness in society which are used as constructs for disaster preparedness modeling. The five components include: knowledge and attitudes, policies, early warning systems, emergency response plans and resource mobilization.[13] Compositely, the parameters for resource mobilization and early warning systems must be realized first by the disaster risk reduction forum for disaster resilient villages through emergency response simulation training activities.

# 2. METHODS

The preparation of this Policy Brief uses a quantitative approach from the results of descriptive research. The results of the research analysis are used to

create disaster preparedness for disaster resilient village communities in Magetan district based on prioritized elements. The preparedness element prioritization technique uses the Quadrant of Difficulty-Usefulness (QoDU). Data was obtained from interviews with forum administrators and communities in 23 disaster resilient villages. 15 respondents were taken from each village using a stratified sampling technique (Strata based on administrators and non-administrators). The interview guide uses the DUEDP questionnaire (Difficulty and Usefulness of Elements in Disaster Preparedness (DUEDP-Questionnaire) with a content validity level of 0.900.[14] Data was collected for 3 (three) months from May-July 2023.

## 3. RESULTS AND DISCUSSION

The following (Figure 1) are the four sides of the quadrant as a guide to making conclusions about element priority analysis using the Quadrant of Difficulty-Usefulness (QoDU) method.

Based on the analysis guidelines for the Quadrant of Difficulty-Usefulness (QoDU) method, the main priority elements that need to be realized are the elements in the upper left quadrant, then the second priority are the elements in the lower left quadrant (priority II).

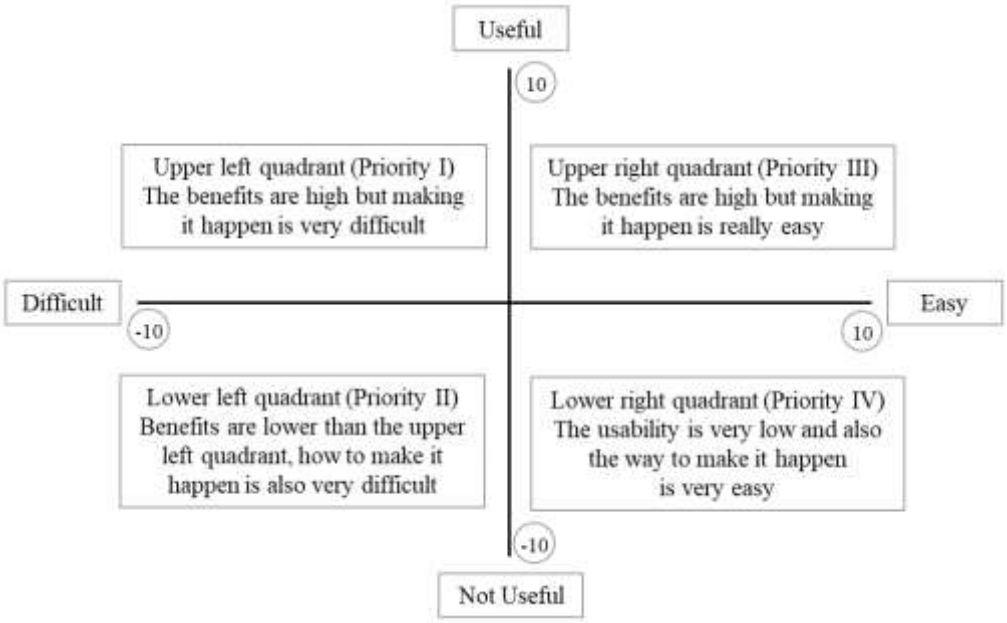


**Figure 1**. Quadrant of Difficulty-Usefulness (QoDU)

The five parameters of community-based disaster preparedness according to research results from the Indonesian Institute of Sciences are knowledge and attitudes, policies, emergency response plans, early warning systems, and resource mobilization. There are 25 elements as construct parameters for disaster preparedness in the Difficulty and Usefulness of Elements in Disaster Preparedness (DUEDP) questionnaire. Four elements form parameters of knowledge and attitudes, six elements form parameters of policy, six elements form parameters of emergency response plans, five elements form parameters of early warning systems and four elements form parameters of resource mobilization.

Four elements form the parameters of community knowledge and attitudes in realizing community preparedness in facing disasters, namely: 1) sources of obtaining information about disasters, 2) ability to take shelter when a disaster occurs, 3) ability of forums to conduct socialization about disasters, and 4) involvement of vulnerable groups in socialization about disaster. The results of the element priority analysis using the QoDU method, the main priority that must be implemented by the forum in realizing community knowledge and attitudes in disaster preparedness is the involvement of vulnerable groups in socialization about disasters.

The six elements in the Difficulty and Usefulness of Elements in Disaster Preparedness (DUEDP) instrument, which are suitable as forming policy parameters in realizing community preparedness in facing disasters, are: 1) availability of village regulations regarding disaster management, 2) establishment of a

disaster risk reduction forum, 3) assessment of village resilience to disasters, 4) availability of village funds for disaster management, 5) availability of disaster management infrastructure, and 6) cross-sector collaboration in disaster management. The results of the element priority analysis using the QoDU method show that the main priorities that the disaster risk reduction forum must work on in realizing policy parameters are: 1) providing village funds for disaster management, 2) providing infrastructure for disaster management and 3) assessing village resilience.

The six elements in the Difficulty and Usefulness of Elements in Disaster Preparedness (DUEDP) instrument that are suitable as forming emergency response plan parameters in realizing community preparedness in facing disasters are: 1) availability of contingency plan documents, 2) availability of evacuation routes, 3) availability of evacuation places , 4) availability of volunteers/quick reaction teams, 5) availability of teams to carry out rapid assessments during disasters, and 6) disaster emergency response training. The results of the element priority analysis using the QoDU method, the main priorities that must be carried out by the disaster risk reduction forum in realizing emergency response plan parameters are: 1) providing contingency plan documents, 2) holding disaster emergency response training and 3) providing a rapid disaster assessment team.

The five elements in the Difficulty and Usefulness of Elements in Disaster Preparedness (DUEDP) instrument that are suitable as forming early warning system parameters are: 1) availability of an early warning system, 2) availability of standard operational procedures for an early warning system, 3) existence of an early warning system communication agreement , 4) the community's ability to respond to early warnings, and 5) the forum's ability to provide communication, information and education on early warning systems to vulnerable groups, including those with disabilities. The results of the element priority analysis using the QoDU method, the main priorities that must be carried out by the disaster risk reduction forum in realizing the parameters of an early warning system are: 1) providing early warning system tools, 2) involving vulnerable groups in communication, information and education on the importance of early warning of threats. disaster, and 3) agree on early warning system communication that is easily accepted by the public.

The four elements in the Difficulty and Usefulness of Elements in Disaster Preparedness (DUEDP) instrument that are suitable for forming resource mobilization parameters are: 1) availability of disaster preparedness bags for each family, 2) availability of disaster emergency response funds from village funds, 3) availability of operational standards logistics distribution procedures, and 4) the forum's ability to build networks in managing resource mobilization. The results of the element priority analysis using the QoDU method show that the main priority that the disaster risk reduction forum must undertake in realizing resource mobilization parameters is to train each family to be prepared to provide disaster preparedness bags, especially families in disaster-prone areas.

Of the five community-based disaster preparedness parameters, in composite terms, the results of priority analysis using the QoDU method, the parameters that must be realized first are resource mobilization parameters and early warning system parameters. Realize these two parameters by providing prioritized elements. Successively, the elements that must be realized are: 1) training each family in disaster-prone areas to provide disaster preparedness bags, 2) providing early warning system tools, 3) involving vulnerable groups in communication, information and education on the importance of early warning of the threat of disaster, and 4) agree on early warning system communication that is easily accepted by the public. The four priority elements of these two parameters can be followed up by holding disaster emergency response simulation training. Emergency response training must be guided by contingency plan documents based on priority threats in each disaster resilient village.

There is a compatibility between the Quadrant of Difficulty-Usefulness (QoDU) method and the Strategy Grid method, however the Strategy Grid method is often used in mapping information system applications based on their contribution to the organization. Strategy Grid method mapping also includes four quadrants, namely: strategy quadrant, high potential quadrant, key operations quadrant and support quadrant.[15] The QoDU method emphasizes only two aspects, namely the Difficulty aspect and the Usefulness aspect, so it is more flexible because it can be used in various fields. The ease of the QoDU

method lies in the aspect of its use; easier, simpler, and analysis is very easy.

Research by Suparji, et al.,[16] reports that in the model of community preparedness for disasters there is no parameter that is most dominant and influences other parameters. It turns out that the five preparedness parameters influence each other. Based on a combined priority analysis using the Quadrant of Difficulty-Usefulness (QoDU) method, the results showed that resource mobilization parameters and an early warning system need to be implemented first based on the perceptions of disaster risk reduction forum administrators and the community in 23 disaster resilient villages in the Magetan Regency area.

Yatnikasari's research states that knowledge and attitude parameters have a significant influence simultaneously on emergency response plan parameters, early warning systems and resource mobilization.[17] Involving vulnerable groups, including disability groups, in socialization, communication and education about disasters, the need for an early warning system and how to take shelter when a disaster occurs is a priority program that must be carried out by disaster risk reduction forums in each village. Forums can use various social media, print media, electronic media and direct education to the community so that access to information about disaster preparedness can immediately reach the community, especially people who are in disaster risk areas.

Village governments, through their forums or capacities, must ensure the resilience of their communities to disaster threats. The urgency of village resilience is reflected in the assessment of village resilience in facing disasters.[18] Village resilience to disaster threats is influenced by the capacity or forum to utilize social, economic and environmental capital in the community and family environment in managing disasters.[19] Providing village funds for disaster prevention, disaster risk mitigation, preparedness by increasing knowledge and capacity skills including the community through various training is one solution to realizing community resilience or resilience in facing the threat of disaster. Village governments through disaster risk reduction forums can work together with other disaster stakeholders in the pentahelix element, to jointly realize resilience or resilience in disaster management.[20]

Research on community disaster preparedness was also conducted by Chen, et al.[21,22] in China, the results of which were that people in China were often exposed to disaster events, but community preparedness in facing disaster threats was categorized as poor. Factors driving society's poor preparedness for disasters include: lack of motivation, low knowledge and understanding of the characteristics of disasters and low attitudes in dealing with disasters. Lack of funding support, lack of forum capacity as a facilitator, lack of institutional support and/or social organizations in the village are also factors in poor community preparedness in facing disasters.[23] Education level, age, social status, ethnic affiliation and occupation have an influence on community preparedness to face disasters.[24] One solution to increase motivation, knowledge and attitudes in dealing with disasters is to include the community in emergency response simulation training.[25]

Enders (2021) states that there are six parameters for building public awareness in disaster emergency response, namely: 1) knowledge about disasters, 2) attitude towards disaster risk, 3) experience in dealing with disasters, 4) exposure to awareness raising, 5) mitigation ability and preparatory response self, and 6) demographic characteristics.[26] Community participation is often underestimated and not included in emergency response simulation training in Delhi, India, leaving communities without a plan for action and often becoming victims.[27] Emergency response planning efforts must be able to shift the paradigm of intervention from government institutions and non-governmental organizations as the main actors to community participation as the main actors. This paradigm shift must be interpreted as meaning that society must have independence in facing the threat of disaster, including recovering after the disaster is over or post-disaster.[28]

The task of the village disaster risk reduction forum in increasing community preparedness in facing disaster emergencies is a task that has an impact on changing behavior. Therefore, competency is needed from the

facilitators in the forum, so that this behavior change framework can be formed among individuals in society. Community awareness to obtain information about disaster risks, perceive the existence of disaster risks in the family, and behave in connecting the source of threat, frequency of threat, risk, impact of risk or exposure and ability to face threats is the main hope for changing behavior itself.

It is necessary to fully realize that science and technology today are capable of producing disaster detection tools; such as flood detection tools, volcano detection tools, tsunami wave detection tools, landslide detection tools, tornado detection tools, etc. The existence of these detection tools is the key to reducing disaster risk, but it has not completely reduced disaster risk, public awareness is still needed about the importance of recognizing disaster threats that give rise to disaster risk.[29] The existence of an early warning system is more about the speed at which stakeholders in a disaster can make decisions, when the community must be alert, alert and immediately get out of the danger radius by evacuating,[30] it is the task of the forum to train it. Disaster risk reduction forums as a capacity must be able to map which communities are classified as vulnerable and are located in disaster-prone areas and which communities are at low risk of being exposed to disaster threats. The forum must have threat maps, vulnerability maps, capacity maps and disaster risk maps for each hamlet, so that these maps can be included in contingency plan documents to be put into practice in the form of village disaster emergency response simulation exercises. The forum and the community immediately agreed on the forms and tools of early warning, how to communicate and how the community has the ability to respond to early warnings, thus the forum's work is able to increase community resilience in preparedness to face disaster threats.[31,32]

People who are frequently exposed to disasters are more cooperative in carrying out self-saving measures by evacuating.[33] Students who are exposed to disaster management courses have adequate knowledge and skills in mobilizing during emergency response.[34] Therefore, the disaster risk reduction forum continuously carries out disaster emergency response simulation training so that all parties, including the community, have a positive attitude, are skilled and have a plan for mobilizing to a safe place. Disaster preparedness training influences disaster preparedness.[35] A follow-up to the research results is the need for emergency response simulation exercises in accordance with the existing scenarios in the contingency plan document.

Community-based disaster preparedness activities ultimately play an important role in developing adaptive capacity to achieve village community resilience in facing disasters.[36] Further study is needed on the important role of non-governmental organizations, social organizations, partnership institutions in the pentahelix element to play a role in community-based disaster management. The involvement of volunteers, social workers[37] and humanitarian activists is very much needed in all disaster preparedness activities.[38,39]

## 4. IMPLICATIONS AND RECOMMENDATIONS

*1. The need for an action review for the Village Disaster Risk Reduction Forum to Realize Disaster Preparedness*

The village disaster risk reduction forum, together with volunteers and other capacity elements, immediately carried out a review of actions to realize disaster preparedness for their respective village communities, starting from realizing resource mobilization parameters and early warning system parameters. Successively, the elements that must be realized are: 1) training each family in disaster-prone areas to provide disaster preparedness bags, 2) providing early warning system tools, 3) involving vulnerable groups in communication, information and education on the importance of early warning of the threat of disaster. , and 4) agree on early warning system communication that is easily accepted by the public. Technical facilitation in realizing these preparedness elements can be in collaboration with facilitators from district-level disaster risk reduction forums or other similarly trained facilitators.

*2. The need for cooperation with pentahelix elements in realizing disaster preparedness*

Village disaster risk reduction forums can collaborate with other similar village forums including elements of the pentahelix (universities, mass media, business world, government and non-governmental organizations) in realizing the resilience and resilience of their villages in facing disaster threats in various preparedness activities.

*3. Carrying out Disaster Emergency Response Simulation Exercises in Villages*

The village disaster risk reduction forum immediately proposed funding for emergency response simulation training activities to the village government. The training targets are village disaster risk reduction forum administrators, volunteers, capacity and several affected communities. The training intensity is six working days or the equivalent of 40 JPL (lesson hours). The most important training material is preparing contingency plan documents followed by developing scenarios prepared by the design team through focused discussions (Focus Group Discussions) with participants on scenarios to be clarified and validated so that they become valid scenarios through TTX (Table Top Exercise), CPX (Table Top Exercise) activities. Command Post Exercise)/ command post rehearsal and FTX (Field Training Exercise)/ field rehearsal.

### Conflict of Interest

The authors declare no conflict of interest

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