



The Level of Community Preparedness in Facing Drought Disasters

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Abstract

In 2024, a drought in Kajen District caused many agricultural lands to fail and hampered community activities. Kajen District is the capital city that supports the center of activities. If a drought occurs, of course, this will inhibit the activities in it. This study aims to analyze the level of drought disaster preparedness in Kajen District. Specifically, the research location is a village affected by drought, namely in Gejlig, Kebonagung, Sambiroto, Tambakroto, and Tanjungsari Villages. This study uses a quantitative deductive approach, a questionnaire in the affected villages totaling 104 questionnaires. Based on the drought disaster preparedness analysis results, it is known that the parameter with the highest value is knowledgeability and attitude towards the risk of disaster, which is 98.08%. For cluster analysis, it was found that Gejlig, Sambiroto, and Tambakroto Villages were in class 1 (high), Kebonagung Village (medium), and Tanjungsari Village were in class 3 (low). When viewed based on the Pekalongan Regency RTRW 2020 - 2040, Kajen District is directed as "PKL", namely an urban area that functions to serve district-scale activities or several districts so that it needs to be supported by a clean water supply so that drought does not occur. With this drought disaster, the Regency Government must encourage policies and protocols to overcome drought disasters, such as irrigation infrastructure rehabilitation, land and water conservation and reforestation, especially in the Southern Part of Pekalongan Regency.

Keywords: Preparedness; Disaster; Drought.

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Introduction

A disaster is a severe disruption of the functioning of a community or society on any scale caused by a hazardous event that is related to conditions of exposure, vulnerability, and capacity, resulting in human, material, economic, and environmental losses and impacts (Nations, 2009 (Fajar Pramono et al., 2020; Kurnia et al., 2020)). One of the global commitments to strengthen disaster risk reduction is the Sendai Framework for Disaster Risk Reduction 2015-2030.

This commitment agreement is voluntary and non-binding and emphasizes the state's role in reducing the risk of disasters that occur and highlights the shared benefits of responsibility between other stakeholders, including local governments, the private sector, and others (Eltinay & Harvey, 2019). Based on research (Gaborit, 2022), there is a consensus that climate change is one of the greatest threats of our time. In the coming decades, it is estimated that climate disasters such as droughts, floods, hurricanes, and rising sea levels will occur more frequently than usual, disrupt ecosystems, and endanger local communities, which will have implications for displacement and refugee movements.

Drought is a significant lack of rainfall compared to the norm over a long period in spring and summer, with high air temperatures that cause the soil to dry (Frolova et al., 2017). This is in line with research (Petkova, Celovsky, Tsai, & Eisenman, 2017; Salvador, Nieto, Linares, Díaz, & Gimeno, 2020), which studies the impact of drought on the health sector are very numerous. Based on research (Cred, 2020) Drought disasters account for 5% of all-natural disasters, and the total number of people affected by drought in the world during the period 200-2019 was 1.43% or 35% of the number affected by natural disasters, making drought the second most significant type of disaster after floods.

Climate change and the emergence of climate-sensitive disasters (derived from hydrology, meteorology, and climate) can impact human health and cause increased mortality and morbidity (Ebi et al., 2021; Grigorieva & Revich, 2021). The role of regional and city governments in climate mitigation and adaptation is considered very important (Oleson et al., 2015; Rosenzweig et al., 2018). This research on drought disaster preparedness is in line with the research outputs (Grigorieva & Livenets, 2022) which requires development related to disaster preparedness to reduce the risk of natural disasters and support a health system that is resilient to climate change.

In 2023, climate change will occur, resulting in the El Nino phenomenon, a phenomenon of warming sea surface temperatures above average conditions in the Central Pacific Ocean. One of them hit Pekalongan Regency, which is located in Central Java Province. One of the impacts of the El Nino phenomenon is a prolonged drought. Based on data from the Regional Disaster Management Agency at the end of 2023, the drought disaster affected 8 out of 19 sub-districts (42.11%).

The location of this research is in Kajen District, Pekalongan Regency because Kajen District is the center of government, and if a drought occurs, it will disrupt activities there, especially in the form of offices, settlements, agriculture, education, and trade and services. There still needs to be more research on drought disaster preparedness that needs to be done to discuss it, and this research does not exist for the Pekalongan Regency, especially in the Kajen District. This study aims to analyze the level of drought disaster preparedness in Kajen District. Hopefully, this research can be an input for the local government of Pekalongan Regency to improve disaster preparedness, especially drought disasters.

Research Method

This study uses a quantitative deductive approach by distributing questionnaires to all affected villages with 104 questionnaires. This questionnaire is intended for people affected by the drought disaster and is based on disaster data from the Pekalongan Regency BPBD in 2023. The questionnaire is a closed questionnaire with two choices: no (1) or yes (2). The drought disaster in Kajen District affects five villages: Gejlig, Kebonagung, Sambiroto, Tambakroto, and Tanjungsari (figure 1).

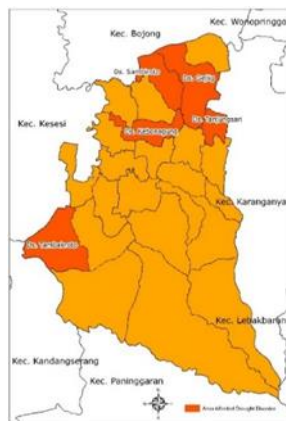


Figure 1. Research Area Affected Drought Disaster

This study used disaster preparedness parameters from various studies (Aldrich, 2012; Perry & Lindell, 2008; Sutton & Tierney, 2006; Thomalla, Downing, Spanger-Siegfried, Han, & Rockström, 2006). Overall, several parameters have similarities and will be used in this study:

Knowledgeability and Attitude Towards Risk of Disaster

The main reason for someone to carry out existing protection activities or preparedness efforts. The knowledge possessed influences the attitude and concern of the community to be ready and alert in anticipating disasters, especially for those who live in disaster-prone areas. Assessment indicators include knowledge about disasters, causes and symptoms, and what to do if a disaster occurs. If you have knowledgeability and attitude towards the risk of disaster, you will have better preparedness than individuals with little or no knowledge of disasters.

Policies and Protocols

Concrete efforts to implement disaster preparedness activities. Policies affect public education, emergency planning, disaster warning systems, resource mobilization, funding, management organizations, human resources and important facilities for disaster emergencies. These policies are expressed in various forms but will be more meaningful if stated concretely in regulations such as local or national regulations. For policies to be implemented optimally, clear operational guidelines are needed.

Emergency Response Management

A plan owned by individuals or communities to deal with emergencies in an area due to natural disasters. It is an important part of a preparedness process, especially regarding evacuation, aid and rescue so that disaster victims can be minimized. Emergency response management is a situation where the community ensures how to divide the work of existing resources during a disaster.

Warning System

Includes warning signs and information distribution if a disaster is about to occur. A good system is where the community also understands the information that will be given and what to do if there is a disaster warning. Therefore, it is necessary to have an exercise or simulation related to disaster warnings to minimize the impact of the disaster.

Resource Mobilization Ability

Preparedness indicators consider how various resources will be used to restore emergency conditions due to disasters to normal conditions. This indicator looks at the various resources an individual or community needs to recover or survive in disaster conditions or emergencies originating from internal or external to the disaster-affected area. Resources have several parts, including human resources and funding/logistics resources.

Regarding the level of drought disaster preparedness, SPSS software will be used to cluster drought disaster preparedness. In its analysis, cluster analysis will be used with the Euclidean equation method and the Ward method (Simamora, 2005).

Results & Discussion

Knowledge Ability and Attitude Towards Risk of Disaster

Knowledge and attitude play an important role in preparedness because they are the primary capital to anticipate drought disasters. Knowledge is related to how someone understands and anticipates disasters, while attitude is how to anticipate drought disasters. Based on the results of the overall analysis, it is known that knowledge and attitudes towards disaster risks in drought-affected areas are included in high preparedness (98.08%). Preparedness regarding knowledge and attitudes towards high drought disaster risks is spread throughout the village (> 90%). This means that the community understands drought disasters, the risks that will be faced, and how to anticipate these disasters, one of which is the efficient use of water and a culture of helping each other regarding water needs. This means that this is good because it will raise awareness of drought risk and can raise general risk (Ward et al., 2020). Socioeconomic and environmental indicators at the household level also influence an area's vulnerability (Masroor, Rahaman, & Sajjad, 2023). Knowledge related to disasters is the initial capital needed to face disasters and can reduce the impact. If the community knows about drought disasters, then the community knows what to do. This knowledge includes drought disasters, risks, the culture of helping each other to share water and efficiency in water use. The culture of helping each other is good and is often applied in Indonesian society. This mutual assistance is in the form of sharing water with neighbors or helping each other to distribute water when there is assistance from water tankers from the Pekalongan Regency BPBD or community self-help. Water

assistance from the Pekalongan Regency BPBD comes from the APBD, health sector (PMI), religious organizations (NU), education (University in Pekalongan) or NGOs.

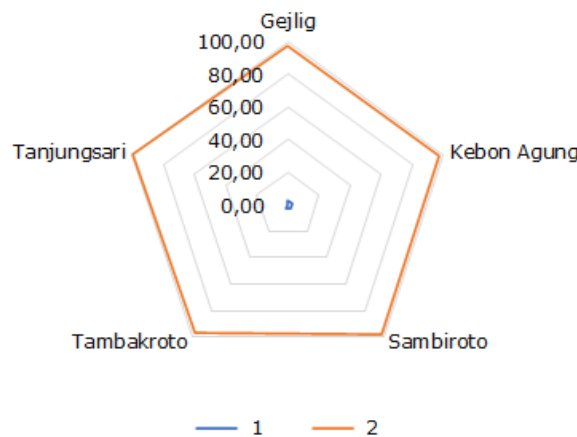


Figure 2. Knowledge Ability and Attitude Towards Risk of Disaster

Policies and Protocol

This analysis discusses policies and guidelines in the event of a drought. Are there any specific policies or standard procedures supported by regulations for community preparedness in dealing with drought disasters? Based on the overall analysis results, it was found that policies and guidelines are in the lower category (42.12%). When viewed based on the distribution of villages, almost all of them are in the less category, with an average value of 42.27% understanding. This certainly deserves attention for the Pekalongan Regency government to improve policies and guidelines because this is more related to the local government. In this case, the government can improve studies on disaster preparedness, especially drought, and prepare policies, guidelines, and standard procedures to address drought disaster preparedness. The relevant government needs to set policies for protecting springs and assessing the impact of groundwater use so that water reserves are reduced. Sometimes, this is like a chain effect, the same as the research conducted (Vicuña, Hanemann, & Dale, 2006) A dam failure caused the pumping operation to stop, thus reducing the water supply and abandoned land and decreasing agricultural profitability. Kajen District is the capital of Pekalongan Regency, which is undoubtedly a center of migration from other areas, either temporarily or permanently. Migration also needs to be considered, considering that it can increase the danger of drought by increasing unsustainable water consumption (Ward et al., 2020).

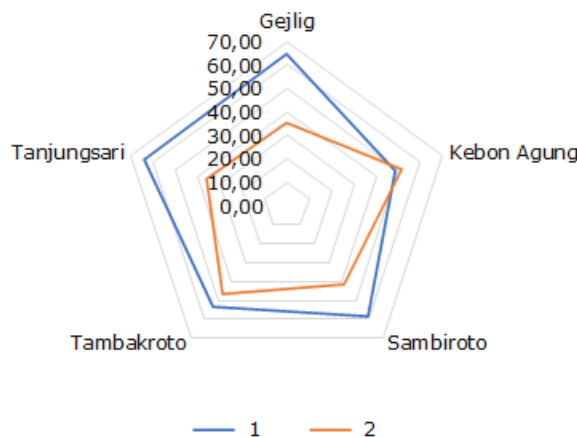


Figure 3. Policies and Protocol

In delivering policies and guidelines, attention must be paid to using innovative and traditional media to disseminate appropriate information and deliver it effectively in various languages (Dariagan, Atando, & Asis, 2021). These policies can shape adaptation pathways in depth and change the overall structure of drought vulnerability at multiple scales (Agrawal, 2010; Urwin & Jordan, 2008). Poverty can result when no policies and protocols exist, so a government role is needed here

(Sinarwati, Putra, & Rona, 2023). Related to this, the government can collaborate with universities in the Pekalongan Regency to create harmony. The study's (Lusiana & Ramaditya, 2023) findings show that although knowledge management does not affect learning organizations, it does affect organizational performance.

Emergency Response Management

This is more related to how disaster organizations exist in the community to anticipate natural disasters such as drought. If there is a disaster organization, then in an emergency, it will be easier to reduce the disaster that occurs and be more prepared to face a drought disaster. In disaster preparedness, apart from the local government and related agencies, the role of this disaster organization is considered essential to help both the organization and the distribution of information about water distribution in the event of a drought disaster. Based on the overall analysis results, it was found that the Emergency Plan is in the lower category (42.07%). When viewed based on the village, all villages are in the less category with an average percentage value of 33.73%. Several villages already have disaster organizations, but only in a few villages, one of which is called "BPBDes." This organization is active and functions to help if a disaster occurs in the village.

Regarding the emergency plan, it is necessary to improve the formation of disaster organizations that are more evenly distributed throughout the village so that preparedness is better. This community organization can collaborate with the local government to build community understanding and competence, such as early warning, evacuation, assistance, and rescue (Dariagan et al., 2021). If there is centralized management, the capacity to handle the complexity of interests and needs related to water becomes limited so that it can minimize water supply shortages caused by climate change (Pahl-Wostl & Knieper, 2014).

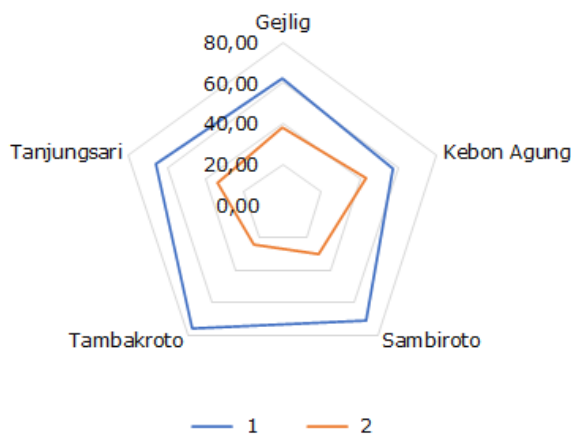


Figure 4. Emergency Response Management

Warning System

Drought disasters have a different warning system from other disasters, usually in the form of warnings and information about drought disasters. These warnings and information are in the form of estimates of the existence of a drought disaster. Based on the results of the analysis, it is known that the disaster warning system in the research area still needs improvement (21.15%). When viewed based on the village, all areas have a meager value, and the lowest value is Sambiroto Village, which is 10.26%. This is due to the uneven distribution of information both technologically and traditionally related to drought disaster warnings. The early warning system for drought disasters can be an alarm if there is a water shortage so that efficient actions are taken in disposing of water (Ward et al., 2020). Apart from alarms, you can also use a geospatial approach as a form of early warning to predict drought disasters in real-time (Adedeji et al., 2020). Apart from that, there needs to be an early warning system at the central to regional levels and the addition of SMS text messaging features such as EWS Innovations, including disaster warning information (Huong, Van Anh, Dat, Truong, & Tam, 2022). It also emphasizes that EWS is a disaster response tool to reduce disaster risk and build community resilience. However, based on empirical research, it still needs to be improved to reduce economic losses (Tang, Liu, & Qiu, 2023). In developing EWS, the country needs more funding to build critical infrastructure supporting EWS to reduce the risk of drought disasters (Dhanya & Geethalakshmi, 2023). This warning system is important because it is an early mitigation method for overcoming drought disasters. Early preventive action, such as water storage and efficiency, will

minimize the impact that occurs. However, this is still minimal, and most warning system information comes too late, so people in the affected areas need more preparation. It is necessary to add 24-hour operators to provide fast and up-to-date information to resolve late information. The key to good communication is that information can be delivered completely and on time. This can be in the form of services on the BPBD website or communication media that are known and understood by the public, such as special disaster applications, WhatsApp groups, Website or Instagram.

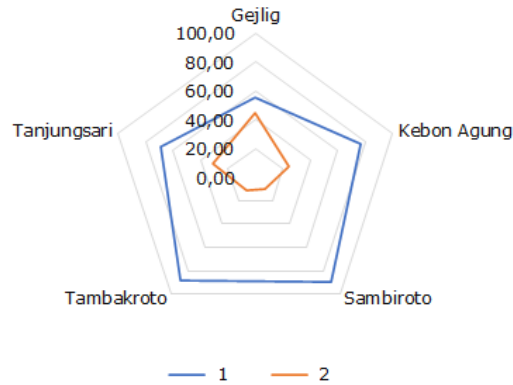


Figure 5. *Warning Sistem*

Emergency Response Management

In this case, it relates to the community's ability to mobilize drought disasters. This ability is assessed from the community's training or socialization about drought disasters. In addition, coordination between stakeholders determines the ability to mobilize disasters. The analysis results show that the ability to mobilize disasters is in a sufficient category (50.24%). When viewed based on the village, almost all villages have a low value except for Tanjungsari Village, which is 58.65%. The ability to mobilize disasters can be improved again by increasing the community's ability to deal with drought disasters by adding training and socialization related to drought disasters. The ability to mobilize disasters is related to many institutional sectors. Hence, it is necessary to determine the responsibility for implementing disaster risk reduction because drought disasters are specific (Dobler-Morales & Bocco, 2021). This is in line with research (Huong et al., 2022), which explains that a sound organizational system will help to face the challenges of disasters at the national, provincial, district, and community levels. Socialization must be done comprehensively in drought-prone areas or focused on areas with high-class droughts (Dhanya & Geethalakshmi, 2023). Overall, emergency response management sufficient has begun to form well, namely with the existence of a disaster organization, the distribution of water during a drought and the preparation of water needs during a drought. In the future, emergency response management needs to be improved so that this disaster organization is active and carries out activities that can mitigate drought disasters.

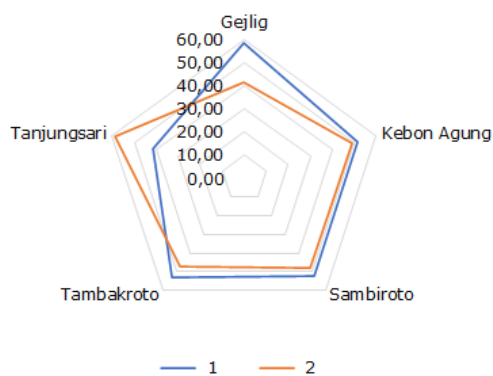


Figure 6. *Emergency Response Management*

All villages affected by the drought disaster have varying values when viewed as a whole. The Knowledgeability and attitude towards the risk of disaster parameter has a high value, while the Warning system parameter has the lowest preparedness value among the other parameters (figure 7). When viewed based on its distribution, the warning system has the lowest value because villages

affected by drought do not have traditional and technological disaster warning systems. Information about the lack of water supply is sometimes not conveyed properly and needs to be on time. Of course, this needs to be improved because this warning system is very important so the community can be prepared for accommodating and efficient water in a drought.

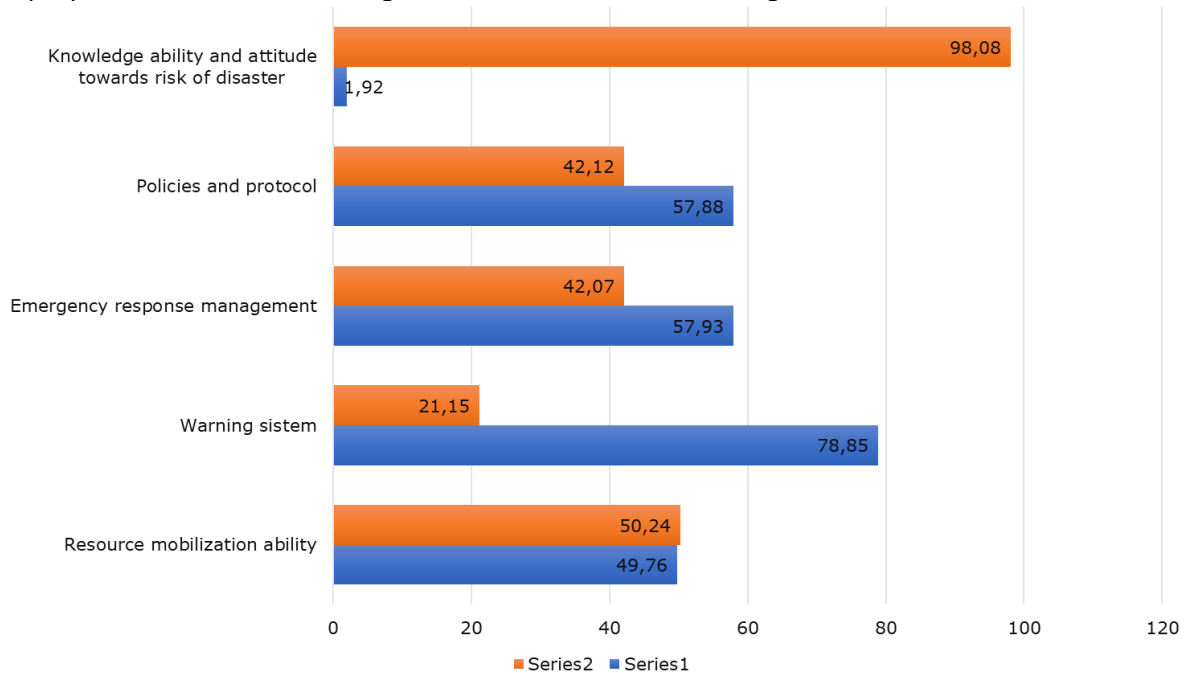


Figure 7. Each Parameter Preparedness Drought

Next, a cluster analysis will be conducted to determine the level of drought disaster preparedness in the affected area. In the cluster analysis, it was found that three villages, Gejlig, Sambiroto, and Tambakroto Villages, had high preparedness. Tambakroto Village is highly prepared because one has the initiative to create Pamsimas to maintain clean water to avoid drought. Several respondents also complained about the poor quality of water, namely, well water changes color to yellow every dry season; this is the background for creating Pamsimas in Tambakroto Village. The color of well water that turns yellow is not suitable for consumption because this water contains high iron and manganese content. These minerals are naturally found in the soil and can enter water sources that pollute wells. Meanwhile, Kebonagung Village, in principle, already knows about drought disaster preparedness, but related to the warning system still needs to be improved. Tanjungsari Village is included in the low classification because it is only good at emergency response management, while other parameters still need to be added. This was answered by several respondents who answered that if a drought disaster occurs, there will be good and tiered communication to request clean water dropping. Meanwhile, Kebonagung Village had medium preparedness, and Tanjungsari Village had low preparedness (Table 1).

Table 1
Level of Preparedness Drought

No	Village	Cluster	Level of Preparedness
1	Gejlig	1	High
2	Kebonagung	2	Medium
3	Sambiroto	1	High
4	Tambakroto	1	High
5	Tanjungsari	3	Low

Source: Analysis, 2024

In the distribution of drought disaster preparedness, it can be seen that most affected villages are located in the center of government and are passed by collector roads. This certainly needs to be watched out for because the government center has many activities, especially related to government

offices and public services. The level of preparedness needs to be improved again, especially in the 3 parameters with the lowest values, namely emergency response management, warning system, and resource mobilization ability. It is known that the Kajen District, based on the Pekalongan Regency RTRW 2020 - 2040, is directed as a "PKL", an urban area serving district-scale activities or several sub-districts. As an urban area, the problem of clean water must be a priority in overcoming it so that drought does not occur in Kajen District. It is necessary to encourage policies and protocols that support clean water facilities and infrastructure to support urban areas, which are the main centers of activity in the Pekalongan Regency. Several things can be done, namely rehabilitation of irrigation infrastructure, land and water conservation and reforestation, especially in the Southern Part of Pekalongan Regency (Kandangserang, Lebakbarang, Paninggaran, and Petungkriyono).

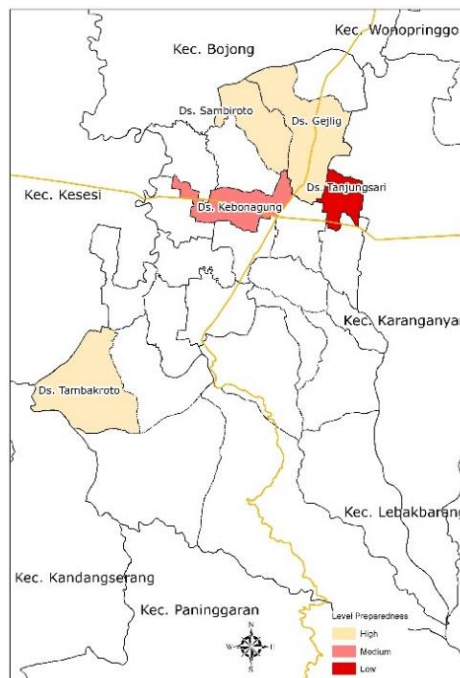


Figure 8. Map Level of Preparedness Drought

Conclusions

The level of drought disaster preparedness in villages affected by drought in Kajen District consists of 3 clusters, the majority of which are cluster 1 (high), namely in Gejlig, Sambiroto, and Tambakroto villages. The highest preparedness parameter is knowledgeability and attitude towards the risk of disaster, which is 98.08%, while the lowest is the warning system parameter, 21.15%. The level of preparedness needs to be improved again, especially in 3 parameters that still lack values, namely policies and protocols, emergency response management, and warning system. The role of the government also needs to be improved in disaster preparedness and collaboration with local disaster organizations so that a well-integrated implementation can be established. Based on the 2020-2040 Pekalongan Regency RTRW, the direction for Kajen District to become "PKN" is as an urban area that functions to serve district-scale activities or several districts so that there needs to be a policy and protocol to overcome clean water problems in Kajen District.

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