

PREPAREDNESS FOR FLOOD DISASTER: A SCOPING REVIEW

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ABSTRACT

Extreme weather occurs in various parts of the world which causes natural disasters. Floods are the most frequent disasters and have the most impact both on life and the economy on a large scale. The purpose of this study is how to prepare for flood disaster management. This study uses the Scoping Review research method. Data search through database sources, namely PubMed, ProQuest, CINAHL and Google Scholar. Keywords Disaster Preparedness AND Community AND Flood Disaster. The literature selection used the PRISMA approach by identifying duplicate articles, inappropriate titles, inappropriate abstracts and with inclusion criteria, namely articles with published years from 2015 to 2021 in English and full text form. Only 22 articles meet the inclusion criteria. The data were analyzed qualitatively with the help of data extraction tables and arranged thematically based on content analysis. These findings indicate that flood disaster preparedness management involves various parties, namely from local government policies and authorities as well as public awareness. Then we need tools to be able to provide fast and precise information such as early warning systems and the use of social media technology for flood risk assessment. It was found from the demographic data of the population in the flooded area, that household disaster preparedness is very low, so it is necessary to provide training to the community on disaster preparedness to increase the knowledge and skills of residents so that they can build a resilient communities in preparation for disaster. It is expected that flood disaster management preparedness involves various parties, such as the central government and local communities, as well as various multi-disciplinary sciences.

Keywords: Disaster Preparedness, Community, Flood Disaster

INTRODUCTION

Extreme situations related to weather and climate issues are increasing in frequency and intensity in many parts of the world. The World Economic Forum in 2019 stated that extreme weather and natural disasters are two global problems that have big impact. (WEF, 2019). Among the extreme weather situations that cause natural disasters, floods are the most frequent disasters and have the greatest impact on both life and the economy on a large scale.

Flood is a condition where the volume of water overflows which can be caused by heavy rain accompanied by insufficient river capacity to accommodate the water (NIDM, 2015). Based on data from the United Nations Office for Disaster Risk Reduction (UNISDR) in 2016, the percentage of floods was 47% of all disasters involving weather since 1995 and affected 2.3 billion people. In that period, 3062 flood disasters were recorded. According to reports, every year floods

claim the lives of around 20,000 people and at the same time impact around 20 million people worldwide. (Kellens et al., 2013).

In an effort to overcome the problem of flooding in recent years, there have been significant results through integrated flood risk management, which aims to minimize the impact and understand what to do when a disaster occurs (Kreibich et al., 2015). One of the aspect key from the integrated flood risk management is how to reduce the loss impact and and preparation before a flood occurs, such as flood-resistant design and construction, development of early warning systems, insurance, campaigning for flood awareness including training and education related to disaster preparation. (Vis et al., 2003).

How society and the state prepare in events that will happen coming is very important in develop a a robust system . In 2015 , 197 countries agreed to A framework the so -called planning *Sendai Framework for Disaster Risk Reduction* . The framework the emphasize importance Handling risk disaster through 4 priorities namely : (i) knowing risk disaster ; (ii) strengthening governance risk disaster ; (iii) investing in reduce risk disaster (iv) increase preparedness , development return , and rehabilitation (UNISDR, 2015).

Although disasters indirectly impact lower-income countries more than higher-income countries, according to the Intergovernmental Panel on Climate Change (2014) all countries at all levels of development have significant underpreparedness to manage future events. Based on this background, the author's aim is to find out what preparedness we can do in facing the threat of flooding through a scoping review of peer-reviewed literature from 2016 to 2021.

METHODS

The research method used in this review is a scoping review. A scoping review is a review used to map the concepts underlying the research area, sources of evidence, and types of evidence available (Tricco et al., 2016). Data searches through database sources, namely Pubmed, Proquest, CINAHL and Google Scholar which are official in nature which are adjusted to the research title, abstract, and keywords used to search for articles. Search article from three *database* using the keywords (*Disaster Preparedness and Community and Flood Disaster*).

The articles were then adjusted based on the previously determined inclusion criteria, the inclusion and exclusion criteria used in this study are as follows:

1. Articles used is the article with year rise start from 2015 to 2021.
2. Language used in the article is English.
3. Articles used is article with form *full text* in pdf format.
4. Theme of the article is *Disaster Preparedness In Management Disaster Flood*.

Exclusion Criteria:

1. Article no originate from accredited journals.
2. Article no *open access*.

After the article selection process is carried out there are 22 articles that fulfill it criteria inclusion . Next 22 articles This read in a way intensive and analyzed using the content analysis method. For more details, the article search process will be explained in the image below:

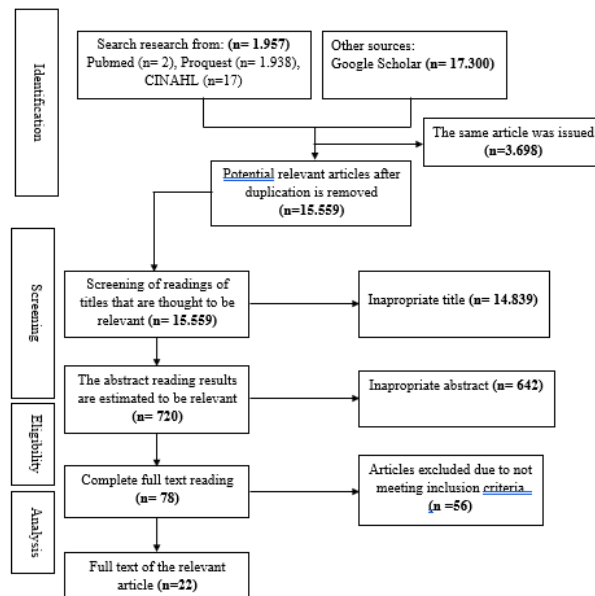


Figure 1. Article Selection Process

Table 1 below describes about things that can be done in dealing with flood disasters (flood disaster mitigation) carried out at home and abroad. Both talking about flood preparedness and about the factors that must be known to develop appropriate mitigation management actions. However, not all flood preparedness measures in other countries can be applied in Indonesia, because they still have to be adapted to local geographic and cultural conditions.

From the articles table below, there are basic things that we can outline in terms of flood disaster preparedness, namely: modification of geographical factors, local government preparedness in making flood disaster mitigation, increasing awareness of residents in flood areas and the use/development of existing technology as means of information and communication.

DISCUSSION

Indonesia is located on the equator so the region has a tropical climate. Because of this geographical position, Indonesia only has two seasons, namely the rainy season and the dry season. During the rainy season, when rainfall is high, this condition triggers tornadoes, floods and landslides.

Flooding is an event when water inundates an area that is not usually flooded within a certain period of time. Floods usually occur because rainfall falls continuously and results in rivers, lakes, seas or drainage overflowing because the amount of water exceeds the holding capacity of the water supporting media from the rainfall or floods can also occur due to human activity, for example: reduction in water catchment areas due to land conversion, deforestation which increases erosion and shallows rivers, as

well as irresponsible behavior such as: throw rubbish in the river and build a residence on the riverbank

Table 1. Research lists

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
1.	Shariff & Hamidi (2019)	Malaysia	Qualitative	50 members selected community based on technique <i>snowball</i> .	Guidelines interview, sheet observation field, notes field, documents and audio-visual tools.	Analysis results qualitative obtained two important things in the process of preparedness disaster, namely: 1. Management risk disaster based on public 2. Intensive mutual cooperation assistance Integration of citizen knowledge with science will help to develop resilient communities. In other words, the community itself has become the first responder to disasters.
2.	Nurumal , et al (2019)	Malaysia	Qualitative Study	75 Informants key (range age 15-72 years) from every House stairs that have experience caught disaster flood.	Guidelines interview, sheet observation field, notes field, documents and audio-visual tools.	There are five themes that emerged from this research related to the development of disaster kits. The themes are community preparedness in dealing with flood disasters, hygiene issues during floods, inadequate food supplies, how communities respond to inadequate water supplies, and methods of dealing with diseases. development of disaster kits for households during evacuation will help communities become more aware and prepared before a disaster strikes
3.	Cheng <i>et al</i> (2019)	Wuhan, China	Case Study	17,047 messages retrieved from the social media platform Sina-Weibo.	-	In the preparedness and response phase, social media played an important role in urban flood disaster events in China, especially in sharing information including weather forecasts, traffic situations, and what witnesses saw and heard. Compared with social media in Western countries, the public cannot obtain sufficient information from Chinese social media in time.

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
4.	Asheneffe, et al (2019).	Ethiopia	Cross sectional study.	806 people vulnerable flood.	To assess flood preparedness in households and factors related , used structured questionnaire and interview guide .	Research result show that level preparedness disaster At home very low stairs matter the influenced by factors resident many are old old , society educated low , income high , no accept message alert at home level stairs , not yet own knowledge about preparedness . Increase preparedness flood at level House ladder is matter yes important for reduce impact flood.
5.	Guo, et al (2021)	China	Cross-sectional study	1018 respondents were taken from public on the plains high, plain low , and the people who live in the area mountains use cluster sampling technique .	Questionnaire	Level of preparedness in the lowlands higher than on public mountains and highlands. In addition, community and environment play an important role in determining individual disaster preparedness
6.	Kanakis & Connar (2016)	Australia	Cross Sectional Study	275 respondents consisting of from 103 respondents male and 169 respondents woman.	The questionnaire is available in both hard copy and online formats.	Communicating personal vulnerabilities to an agency, providing information on how to take preparatory action recommended disaster preparedness, and increasing community involvement can contribute to disaster preparedness. disaster flood which is effective at the community level.
7.	(Raikes et al., 2019)		Systematic review	147 articles that have been through a full-text review involving three stages coding namely: open coding, axial coding and selective coding		There is a number of findings <ol style="list-style-type: none"> 1. not yet existence policies made for handle disaster term long. 2. There is absence continuation between policies and practices in the field when effort subtraction risk disaster relate with other institutions.

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
						3. Governance preparedness and planning pre- disaster part big Still depending on the existing conditions
8.	(Tripathi, 2015)	India	Descriptive Analysis		-	<ol style="list-style-type: none"> 1. Government India Already do Lots effort for reduce impact damage consequence flood 2. Use of media and technology as reminders and actions pre-disaster proven effective for reduce damage 3. Install an alarm system on the edge river for warn if the water rises above the river level. 4. Campaigning readiness alert in affected areas flood 5. Rehabilitation and evacuation people in flood areas before flood hit. 6. supply rapid relief to the affected area disaster. 7. Analysis trends and breakdowns consequence flood for determine effective pre and post disaster mechanisms
9.	(Onwuemele, 2018)	Lagos (Nigeria)	Quantitative descriptive correlation preparedness to flood	200 residents from four affected communities direct flood	Questionnaire about awareness risk flood and preparedness flood	Study show there is positive correlation between awareness will risk flood with preparedness flood. To increase flood preparedness, early readiness is needed so that people are alert to floods
10.	(Noorhashirin et al., 2016)	Malaysia	Descriptive analysis	Data taken from results research, guidelines, laws and regulations about preparedness	-	In general Malaysian public already have a holistic method in convey information and assistance in pre, intra and post- disaster situations. However need improving the pre-disaster delivery system remember situations and patterns weather often

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
				disasters, and regulations ministry		change, also necessary increase awareness public to disaster flood
11.	(Sukeri & Shazwani, 2015)	Malaysia	Descriptive analysis	Data taken from results research, guidelines, laws and regulations about preparedness disasters, and regulations ministry		Comparison preparedness floods in Malaysia, Thailand, and the USA have a number of similarities, namely lack of preparation especially for the affected victims flood because of No Can determine When flood Can happened, because That government have role important in provide effective assistance towards flood victims
12.	(Atreya et al., 2016)	Tabasco (Mexico)	Descriptive correlation for know connection knowledge about risk flood with home preparedness ladder	664 families of 10 communities in Tabasco	Vulnerability and Capacity Assessments	Knowledge about risk own connection positive with readiness alert House ladder in face flood. Experience affected floods also increase preparedness somebody in face disaster flood later day
13.	Priyanti et al (2019)	Indonesia	Qualitative Study	7 participants which live in the village which caught disaster flood	A semistructured interview observation, and field notes	5 main themes: <ol style="list-style-type: none"> 1. All participant Once experience flood, so that they know and be ready face it 2. Warning and information system about flood Already effective 3. Condition housing area Already prepared for disaster flood 4. Citizens do not evacuate to place which provided moment experience flood 5. Source assistance and mitigation must prepared optimally
14.	Shah, <i>et al</i> (2018)	Pakistan	Quantitative	Purposive summing	questionnaire has tested moreover first	Here explanation preparedness in Khyber schools:

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
				4 Districts: (Nowshera, Charsadda, Peshawr, Dera Ismail Khan) 25 respondents	on the head Elementary and Middle Schools	<ol style="list-style-type: none"> 1. Almost all school own Planning emergency disaster 2. Evacuation routes few do, and the equipment still does Not yet adequate 3. almost all location school Far from danger Flood and Building school Already sturdy to disaster 4. Many schools have provide education about disaster flood
15	Perez, et al (2017)	Sahara Africa West, Central , East	Observation		Observation rainfall Rain	Hydrological observations looking at local rainfall in Africa show no indication of flooding. Except with rainfall extreme rain show high relationship with incident flood. Results for various climate varies: West and Central Africa moment climate wet and season Rain will happen flood. But in Africa south and east with climate dry No influential, only to humidity land.
16.	Subandi , et al (2018)	Indonesia, Jambi	Qualitative Experimental	24 residents affected disaster and ready follow training disaster	Pre and Post Control Test in class training	With training This found Increasing Post test results and increase skills inhabitant for responsive emergency in the area vulnerable disaster
17.	Hapsari, et al (2016)	Indonesia	Literature and Interview Result		<ol style="list-style-type: none"> 1. Profile of Indonesia as Study Area 2. Data Collection and Research Method 	<p>Flood is disaster which repeatedly occurred in Indonesia. Management and planning by BNPB have made with good, but Still not enough coordination to implementation disaster on the management team .</p> <p>Solution: development of environmental-based flood control: residents clean rivers, eradicate deforestation. And</p>

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
						information about flood warnings and the need for law enforcement on flood problems
18.	Janice Ying- en Ho (2019) Is “Perceived Water Insecurity” Associated with Disaster Risk Perception, Preparedness Attitudes, and Coping Ability in Rural China? (A Health-EDRM Pilot Study)	Xingguang Village China	Descriptive analysis	52 people		In terms of indicator perception risk disaster, more from half respondents (60.8%) reported having experienced disasters themselves during their lifetime However, only 32.7% of respondents believe they live in the area at risk high disasters Terms of attitude preparedness disaster, 47.7% of 44 respondents agree will importance supply drug for disaster. Only 34.6% reported the need for an emergency bag. Lastly, only 34.6% believe that they have the ability to protect family’s healthy and safety in the event of a disaster.
19.	Frank J. Glago (2019) Household disaster awareness and preparedness: A case study of flood hazards in Asamankese in the West Akim Municipality of Ghana Pakhtunkhwa Province, Pakistan	District ,The West Akim Municipality of Ghana	mixed research methods approach	a stratified sampling method, 200 respondents		Results: 1. The level of flood disaster awareness: 37.5% of respondents have very high awareness of flood disasters, 27.5% high and 30.8% recognize flood disasters as a moderate risk. 2. (61%) became aware of the flood risk in Asamankese through their personal experience with disasters. 3. Awareness effect environment physical and geographical to disaster flood Most (69.5 %) respondent’s own knowledge about its vulnerable areas with flood disasters.

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
						<p>4. Awareness resident about factors caused by humans contribute to flood disasters.</p> <p>(39.2%) gave ranking system poor drainage, 36.7% of respondents highlight development settlement slums and activities from this area like disposal waste that is not right, while 15.8% of respondents highlight about development house on the waterway</p> <p>5. Respondent with basic formal education and those who are educated middle (39.4% and 33.3%) are majority from those who are ranked disaster flood as risk disaster the biggest in it</p> <p>community, compared with those who don't own formal education (15.2%) and high education (12.1%)</p> <p>6. Awareness that individual financial savings were very important in meeting the most basic food and clothing needs immediately after the flood, and extended family support was very important in recovering some of the lost.</p> <p>7. Preparedness and resilience social</p> <p>36.7% and 33.8% of respondents(in FPZ and NFPZ) shows that structure social family very important to ready faceflood.</p>
20.	Ian Mc Callum, et. al. (2016)	Austria	Review article			<p>1. Use mobile technology in related data collection with disaster flood collected from level community with use</p>

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
	Technologies to Support Community Flood Disaster Risk Reduction					<p>application more carry on for management risk floods that include:</p> <ol style="list-style-type: none"> 1) Danger: For example with use social media twitter can collected 150,000 tweets in 24 hours (Jakarta, 5 Feb. 2014) so that happen mapping area flood. 2) Explosion: Mapping element exposed from community until global level, various application Can made into as related data collection with infrastructure like GPS application 3) Vulnerability <p>2. Evaluation risk user - focused flooding technology</p> <p>Information collected by individuals trained through the video that will spread out through technology mobile</p>
21.	Wicaksono, et.al (2018) The internet of things (iot) for flood disaster early warning in dki Jakarta : prospect and community preparedness	Indonesia				<p>Implementation system information as system warning early countermeasures flood in Jakarta in the year in a way infrastructure Already competent This is proven with the abundance of internet and smartphones users in the area urban compared to with other areas. In addition, the development IoT concept as a ways mitigation has carried out in various countries with various such</p>

No	Author & Year	Place Study	Research Design	Sample	Instrument	Results
						forms and models appearance can be more easy implemented in Jakarta.
22.	Remember Samu.,et.al (2020) Pre-disaster planning and preparednes	Zimbabwe				Mitigation the floods that occurred in Zimbabwe were with do restrictions on settlements in the area vulnerable flood and with invest in protection flood with built infrastructure like embankments , dams , mangroves and warning systems early .

Flooding is an event when water inundates an area that is not usually flooded within a certain period of time. Floods usually occur because rainfall falls continuously and results in rivers, lakes, seas or drainage overflowing because the amount of water exceeds the holding capacity of the water supporting media from the rainfall or floods can also occur due to human activity, for example: reduction in water catchment areas due to land conversion, deforestation which increases erosion and shallows rivers, as well as irresponsible behavior such as: throw rubbish in the river and build a residence on the riverbank.

In facing the threat of disasters, including floods, preparedness is the key to safety. Preparedness is a series of activities carried out to anticipate flood disasters through organization and appropriate and effective steps. The three main efforts in preparing a disaster preparedness plan according to BNPB are: having a family emergency plan, storing 10 items that will be needed during a disaster and listening to information from various media such as radio, television, online media and other official sources.

Many articles discuss things that must be considered in preparing for flood disasters, which are carried out both at home and abroad, namely:

1. Competent authority

In many countries disaster management is decentralized involving cross-sector and cross-level policy holders at all levels of hazard. The main responsibility for disaster management falls to government institutions and voluntary individual action (Raikes et al, 2019). In the Netherlands the maintenance of flood defenses is completely under the jurisdiction of the government. In Australia disaster management responsibilities are divided between

three levels of government. In America and England, government institutions are required to handle disasters through law, but not individuals. On the other hand, in France, land and building owners are obliged to contribute to the maintenance of flood prevention structures on their property by paying financial costs. Based on this, the authority that is obliged depends on the type of disaster and its purpose. In Indonesia itself, according to Hapsari, et. Al (2018) needs to develop environmentally based flood management: residents clean rivers, eradicate deforestation. And information regarding flood warnings as well as the need for law enforcement regarding flood problems.

2. Policy or regulation

Each country has its own policies in dealing with disasters, especially floods. However, good government policies in dealing with floods cannot function as they should if they are not accompanied by good field practices. For example, when the 2011 floods hit Thailand, they already had a flood prevention policy, but when this situation occurred the policy mechanism was not appropriate in the field. After this incident, the government carried out improvements and improvements, learning from the flood and making short and long term plans to deal with future floods. (Sukeri & Shazwani, 2015). Flood mitigation carried out in Zimbabwe is by placing restrictions on settlements in flood-prone areas and by investing in flood protection by building infrastructure such as embankments, dams, mangroves and early warning systems. (Ingat Samu, et.al, 2020). Therefore, the government has an important role in policies that are appropriate to the context of

prevention in the field to minimize the impact of flood disasters.

3. *Early Warning System*

Early Warning System (EWS) is an important mechanism that can provide fast and accurate information through authorized institutions, thereby enabling individuals directly affected by danger to take action, avoid or reduce risks, and respond effectively. An effective example is a weather and flood forecast service for the public which can be accessed directly in real time. Furthermore, flood forecasting systems form a key part of preparedness in facing flood disasters by providing early warning for the next few days and reducing the impact of floods. This early warning system is starting to be developed using existing technological advances, in Indonesia IoT (The internet of Things) is being developed as a mitigation method that has been carried out in various countries with various forms and models in such a way that it can be more easily implemented in Jakarta (Wicaksono et. al., 2018), using an application in the form of an IoT-based Early Warning System that utilizes the internet and smartphone networks.

4. Awareness public

Public awareness of floods is a determining factor in flood preparedness. Research (Onwuemele, 2018) in Nigeria shows that there is a positive correlation between awareness of flood risk and flood preparedness. This is also confirmed by research conducted in Ghana (Frank J. Glago., et.al., 2019) which states that the level of awareness of disasters, flood awareness, awareness of the effects of the physical and geographic environment where they live, awareness of the causes of

flooding due to the contribution humans and preparedness strategies adopted to deal with flood disasters, are all mitigations that can be applied in preparedness to face flood disasters.

According to Janice Ying-en Ho (2019) public awareness also concerns what things or objects the community must prepare when a disaster occurs, namely medical supplies, emergency bags, flashlights, matches, blankets and whistles, as well as having the ability to protect the health and safety of the family in the event of a disaster. Apart from that, according to Nurumal, et.al., (2019) there are 7 kits that can be prepared for disaster preparedness; general supply kit, documentation kit, emergency food and water supply kit, prayer kit, hygiene kit, basic first aid kit, and baby supplies. The development of disaster kits for households during evacuations will help communities become more aware and prepared before disaster strikes. So as to help the community in handling and managing the situation and reducing the impact of losses when a flood disaster occurs. According to Kanakis & Connar (2016), apart from the need for increased involvement in the community, it can contribute to effective preparation for flood disasters at the community level.

5. Use of technology and social media for flood risk assessment

The use of mobile technology in collecting data related to flood disasters collected at the community level using further applications for flood risk management in Austria (Ian, Mc. Callum, et.al., 2016). According to Cheng et.,al (2019), in the preparedness and response stages, social media plays an important role in urban flood disaster events in China, especially in sharing information

including weather forecasts, traffic situations, and what is seen and heard. From the research results it was found that there was a significant time lag effect (one day) between peak rainfall and general public participation, and there was a three days lag between peak rainfall and the dissemination of opinion messages.

Compared with social media in Western countries, the public cannot obtain enough information from Chinese social media in time. Social media has not played other important functions, such as two-way communication, decision support, and so on.

6. Training for the community regarding disaster preparedness.

By holding training, residents' knowledge and skills can be increased for emergency response in disaster-prone areas (Subandi, et. al., 2018). Knowledge about risk has a positive relationship with household preparedness in facing floods. Experience of being affected by floods also increases a person's preparedness in facing flood disasters in the future (Atreya et.al., 2016). In Pakistan, disaster preparedness training has been piloted at school level from elementary school to high school (Shah, et.al., 2018). This is in line with qualitative research written by Shariff & Hamidi (2019) that the integration of citizen knowledge with science will help to develop resilient communities. In other words, the community itself has become the first responder to a disaster. Having high technology is meaningless if humans are not knowledgeable enough to save themselves. Therefore, building resilient communities means that communities have knowledge (either through learning or experience and traditional and local wisdom) about their vulnerabilities and capabilities.

7. Demographic data on the population around the disaster

Research conducted by Ashenefe, et.al., (2019) shows that the level of disaster preparedness in households is very low, this is influenced by the factors that many of the population are old, people with low education, high income, not receiving alert messages at the household level, do not yet have knowledge about preparedness.

CONCLUSION

Based on the review carried out, it was concluded that preparedness in flood disaster management must be carried out as an effort to reduce the impact of existing flood disasters. Flood management must be carried out simultaneously from various parties, namely from local government policies and authorities as well as public awareness. Then we need tools to be able to provide fast and accurate information, such as early warning systems and the use of social media technology for assessing flood risk. It was found from population demographic data in areas around the flood disaster that household preparedness was very low, so there was a need for training in the community about disaster preparedness to increase the knowledge and skills of residents so that they could build a resilient community in disaster preparation

SUGGESTION

The results of the scoping review recommend the need for preparation for flood disaster management by various parties from the central, regional government and local communities as well as the need for involvement with various multi-disciplinary disciplines considering that disaster risk management is a shared

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