ICT for public awareness culture on hydrometeorological disaster

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A R T I C L E   I N F O

A B S T R A C T

The understanding of the disaster-aware community is very important in increasing preparedness to face various disaster threats that exist in Indonesia. Public awareness of disasters can be supported by social media through information and communication technology (ICT). This study aims to examine the role of information and communication technology in providing information on hydrometeorological disasters; the preparedness of community groups to face disasters in areas prone to hydrometeorological disasters; and disaster preparedness as a culture in people's daily life. The method used was purposive sampling, FGD, and in-depth interviews with several key informants. The results obtained were tested for validity, dependability, and source triangulation. The results of the study indicate the role of information communication technology as a vital infrastructure used by almost all stakeholders in providing information on hydrometeorological disasters, especially disaster warning information. The preparedness of community groups was a good and very good category for disaster management. Meanwhile, the preparedness of community groups in disaster-prone areas of Sriharjo, Selopamioro, Karangtengah, and Kebonagung villages is in a low category because the intensity of preparedness at the village level and group level is carried out once a year even though the potential for disasters occurs more than 3 events per year.

1. Background

The culture of disaster awareness in Indonesia was still evaluated as low; because the culture should be followed by the daily habit attitudes that are based on disaster awareness. This culture is substantial because of Indonesia's risk of various disasters. In 2019, Indonesia experienced 3.814 disasters and about 99.02% of them (3.772 occurrences) were hydrometeorological disasters. The trend of hydrometeorological disasters in Indonesia shows anis increasing number in recent years [1]. Climate change is expected to contribute to the rising occurrences of hydrometeorological disasters, such as flooding, landslides, and tornado [2].

The capacity of Indonesian for disaster rose after Aceh's tsunami in 2004, but the attitude of disaster awareness has not become a habitual action in the community's daily life. The culture of disaster awareness is extremely important; because hazards can occur anywhere and anytime. Reduction of risk efforts can be implemented by changing the manners of humankind and increasing awareness as well as environmental care. Human attitudes could be managed by changing mindsets and familiarizing ourselves with the environment and disaster awareness from an early age [3]. The attitude and disaster awareness should become a behavior for Indonesian people because of the high risk anytime and anywhere. This becomes a challenge for stakeholders in disaster reduction to prepare the communities in facing the risk.

The overall trend of the number of disaster events in Indonesia has relatively increased, especially in the last 5 years. Data on

Indonesian Disaster Information (DIBI) - BNPB (2021), reported that disaster events experienced a significant increase from 1703 disasters in 2015–5003 disasters in 2020, and each year was always dominated by hydrometeorological disasters. The World Risk Index (2022) also ranks Indonesia 3rd out of 192 countries in the world most at risk of disasters. The increasing number of disaster occurrences is reciprocal with the raising number the disaster victims. This indicates the lack of communities' preparedness facing the hazards although the media has given the information. Disaster socialization has been conducted by the governments through local and national programs initiated by various institutions, such as disaster-ready school (Sekolah Siaga Bencana - KSB), disaster safe education unit (Satuan Pendidikan Aman Bencana - SPAB), disaster-ready village (Desa Tangguh Bencana - DESTANA), and integration between disaster with the school curriculum in elementary, secondary, and senior high school. The government through BMKG has built IT system through social media and website as well as expanded through television so the communities can access the disaster information easily. Nevertheless, this information has not reached the grassroots community due to limited knowledge of the use of technology, and in general, people are only interested in television media when a disaster has occurred but not in preparedness.

Social media becomes more beneficial as it creates connectivity among users [4]. Moreover, access to social media has become a primary need for individuals, including disaster information needs. Social media could be used to increase the communication function before, at, and after the disaster [4–6]. Social media can be used as a channel ominimize loss, decrease fatalities, and reduce time and costs in disaster management [7]. These communication tools are effective and can be used through phases of disaster management, the communication in emergency response provides important information to communities in taking action and accessing help [8,9], and the key success in all phases of disaster [10]. Local Government should accommodate effective disaster risk communication understandable by the community [11].

The role of communities in using social media is not only as the users who receive information; but also as the informants. Other parties who receive this information are the functionaries, decision-makers, stakeholders, and media redaction [8]. Social media gives contribution to disaster management as warning, impact, response, and relief [12]. These roles could be divided into eight social-temporal stations, they are; occurrences prediction, emergency response, occurrences detection, language changes, disaster search, situational awareness, equipment, and crowdsourcing. The usage of social media in a disaster can be divided into six themes, they are situational awareness, data collection methods, distributed sensor systems, news classification, sentiment analysis, and digital volunteering [5]. From the previous benefits, the quality of information becomes extremely crucial in disaster management because the community will be always looking for sharing information during the occurrences. The development of ICT in disaster management and the massive progress of ICT systems need credible and trusted information [13]. The technology has the potential to increase information capacity, dependency, and interactivity [4]. The big and developed user basics and two-way communication support social media as a vital part of business, organizations, and individuals to be involved in dialogue and content sharing [14].

The introduction and implementations of ICT specifically related to the disaster have actually been developed at this time, such as those contained in the petabencana. id application. The petabencana. id application provides accurate and up-to-date information related to disasters that occur in Indonesia, especially hydrometeorological disasters such as floods and landslides that often occur. This application was developed by PetaBencana.id and has been used by several agencies and institutions in Indonesia, such as the [15] and the Indonesian Red Cross (PMI). The counseling and training related to the use of this (ICT) application are considered not optimal enough, have not reached the user community in various disaster response communities, and have not reached several layers of society and several regions, especially those with a high disaster risk index. In addition, in fact the communities do not have access to disaster information to build an emergency response. Most of them use this information after the occurrences to know the impacts of disaster. On the other hand, communities as the victims need accurate information to relieve the psychological burden (Susanto et al., 2011).

Based on the background, the study objectives are: a) to analyze the role of IT in providing hydrometeorological disaster information; b) to analyze the preparedness capacity of a community group in hydrometeorological disaster risk areas; c) to analyze the preparedness in disaster as a culture on the communities.

2. Literature review

Many institutions have arranged guidance on how to do preparation for emergency events, the strategy commonly in line with the government to traditional communities, one to many communication modes which were marked by few or no interaction with the public.. The usage of social media by stakeholders shares information from similar sources in coordinating disaster relief and sharing emergency alerts [16]. Social media have been frequently used to share and collect disaster information [5], it creates disaster awareness, risk perception, and emergency preparedness behaviors [17]. It is undoubtedly that preparedness can be such key on how people react against potential hazard. There must be the involvement of multi-stakeholder particularly government and community [18]. Social media can improve capacities, especially when flooding occurs [7]. There are four main types of social media users, they are innovative, reactive, responsive, and proactive [19]. Social media have been significantly developed as the new public information channel besides mass media such as television, newspapers, magazines, and radio [20].

Social media offer participation process and collaboration from many actors and increase the capacity to observe the massive information as new knowledge [21]. Social media have many variations according to the focus and functions, but in a wider concept, they allow users to share content, connect with others and make conversation. Social media can influence how individuals learn, interact, and manage [4,22]. Social media and Social Media Analysis Tools (SMAT) are not only tools to respond the disaster; but also are used by humanitarian actors in national communities in various disaster management phases, including emergency response. The usage of these analysis tools is influenced by the interaction of seven resistance factors which are related to the users and the tools: language, culture, values, finance, human resources, technology, and data [23]. A cultural system is a chain of ideas, concepts, norms, and customs that regulate human behavior in communities as the ideological form of culture (Kamus Istilah Antropologi, 1984).

Capacity is the ability of resources, knowledge, skills, and strength possessed by a person or community that allows them to maintain and prepare for, prevent, and mitigate, cope with adverse impacts, or quickly recover from disasters (BPBD, 2015). Furthermore, coping capacity is the ability of the community, both individuals and groups, to take action to reduce the level of threat and the level of loss due to disasters (BNPB General Guidelines for Disaster Risk Assessment, 2012).

Culture comes from the programs and activities conducted together which presuppose individuals and communities ~~to~~ respond to their environmental condition [24]. Culture can be defined in three forms, they are; 1) culture as the development process of intellectualism, spiritualism, and aestheticism; 2) culture as the way of life from a nation, a period, a community, or mankind; 3) culture as the form of work and intellectualism activities, especially artistic activities [25]. Community behavior patterns are human work in their communities [26]. Culture is a configuration of behavior that is learned and the behavior results whose elements are used together and shared by communities [27].

The threats of hydrometeorological disasters are commonly typhoons, droughts, floods, heatwaves, extreme snow, and storm, but they can also develop into other disasters, such as epidemics, landslides, plague, and huge fires (USAID, 2016). Preparedness is actions that enable decision-makers including governments, organizations, communities, and individuals to respond to disaster situations immediately and efficiently [28] with the capacity for knowledge and behavior in emergency response plans [29]. Preparedness index can also support to estimate the local capacity towards potential hazaroud event [30].

3. Materials and methods

3.1. Study area

This study was conducted in the Special Region of Yogyakarta Province, Indonesia, focusing on hydrometeorological risk areas. The selection of location was conducted by purposive sampling in the Imogiri district, Bantul Regency. The selected villages were: Sriharjo and Karangtengah which are flowed by Oyo and Celeng Rivers, Selopamioro which is flowed by the Oyo River, and Kebonagung as a disaster-ready village (Kampung Siaga Bencana) [31].

The research objects are volunteers from Taruna Siaga Bencana (Tagana), the disaster community in Kampung Siaga Bencana (KSB), and disaster management forum or Forum Penanggulangan Bencana (FPRB), and disaster volunteers from the public in four research locations. The selection of informants was conducted through purposive sampling. In-depth, ~~the~~ interview was conducted with village governments, administrators and members of KSB, coordinator, and members of Tagana, and administrators and members of FPRB. Focus Group Discussion (FGD) was conducted with; 1) Tagana volunteers; 2) KSB communities; 3) FPRB; 4) disaster volunteers from the public; and 5) village government. FGD was divided into three discussion topics: a) the role of information technology; b) Preparedness culture; c). This research used validity and dependability assessment with triangulation techniques: a) Source triangulation (public figures, public, and communities); b) Data collection triangulation with an in-depth interview and FGD [32,33]. Moreover, this study also collects literature or secondary data [34] as the complementary of field result.

3.2. Data analysis

Data analysis was conducted interactively and continuously until reached information saturation as the last step of data processing. The activities in data analysis were: 1) data reduction; 2) themes connection; 3) verification [35]. The conclusion was obtained from

Table 1
Preparedness Factor and Indicator Assessment.

Preparedness Factor	Indicator	Informants																	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1. Knowledge and Behavior (A)	Knowledge (A1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Behavior (A2)	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
2. Emergency Response Plans (B)	Family's Strategy to Respond Emergency Indicator (B1)	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Evacuation Plan (B2)	✓	✓	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	✓
	Aid, rescue, health, and safety (B3)	-	-	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Primary Needs Fulfillment (B4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Tools and Equipment (B5)	✓	✓	-	✓	✓	✓	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Important Facilities (Hospitals, Fire Station, Police, police, municipal waterworks, state electricity company, telecommunication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓

the strong proof supporting the steps on analysis. The application of information technology networks through community groups will allow it to be replicated with other community groups with similar social conditions.

The categorization of indicators in this research consists of very bad, good, and very good with the following percentage:

1. 0–33,33%,
2. >33, 33–66,66%, and.
3. > 66,66–100%

4. Result and discussion

4.1. The role of technology in hydrometeorological disaster

The application of Facebook website ~~are~~ is widely used by communities in Imogiri. The Facebook group named "Sedulur Imogiri" was created as a channel for Imogiri communities to obtain and share news about disaster occurrences, calamities, ~~and~~ disaster relief, and updates. This group was created in 2014 and it has been active until now. The group reaches 36.267 members with an average number of new members is about 500 people per month and 50 new posts per day. This group was set to a closed privacy which only allows members to send and access information in the group. Each Facebook user can propose to be a member by completing a form containing questions about the reason to join, then waiting for ~~the~~ acceptance from administrators. As a familiar platform, a Facebook account can be known to affect the image of public eye [36], i.e. the existence of "Sedulur Imogiri" Facebook Group that can create disaster awareness in the society.

The number of personnel who attended the FGD included Tagana personnel totaling 8 people, FPRB 4 people, KSB 10 people, ORARI 3 people, Village officials 7 people, etc. as written in the description of Table 1, from the results of the FGD used WhatsApp for communication with each other. The number of participants has fulfilled the quota because each attended more than 50% of the members. Each member of those disaster groups gathers in WhatsApp Group (WAG) to share and get updated information. WAG is used as a reporting channel by sending photos and videos of disaster occurrences, besides Handy Talkie (HT). The disaster information plots from the interview and FGD results are presented in Fig. 3 (see Fig. 1) .

BMKG application is a major application to access information about weather, earthquake, climate, air quality, and similar information. The information from BMKG can be accessed through Twitter, Facebook, mobile applications, and the website at www. bmkg.go.id. Most of the members in disaster volunteer WAG get information when a member has sent the BMKG information to the group through links or news screenshots. Twitter is also considered an updated application for providing quick and accurate information about disasters. The information can be obtained through other institutions that have been verified by BMKG, such as BNPB. The flow of disaster information in social media and how the communities utilize it depicts in Fig. 2.

Figs. 2 and 4 shows how information from BMKG news and social media such as Twitter, FB, Whatsapp groups, and BNPB can reach the community through the coordination of community groups concerned about disasters (see Fig. 5).

4.2. Community preparedness in hydrometeorological disaster

The preparedness in four study areas was supported by the disaster knowledge capacity of the government, Tagana, KSB, FPRB, and disaster volunteer communities from village residents. The result of interviews about factors and preparedness factors from key informants from each group is presented in Table 1.

Based on the preparedness indicator recapitulation, the results obtained as follows.

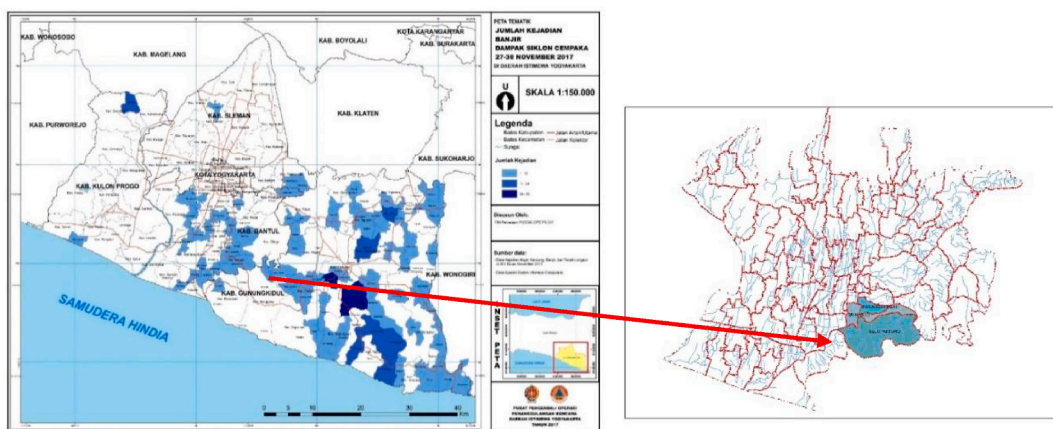1. Knowledge and Behavior Factors (A)

Fig. 1. Map of study area in hydrometeorological disaster risk Area
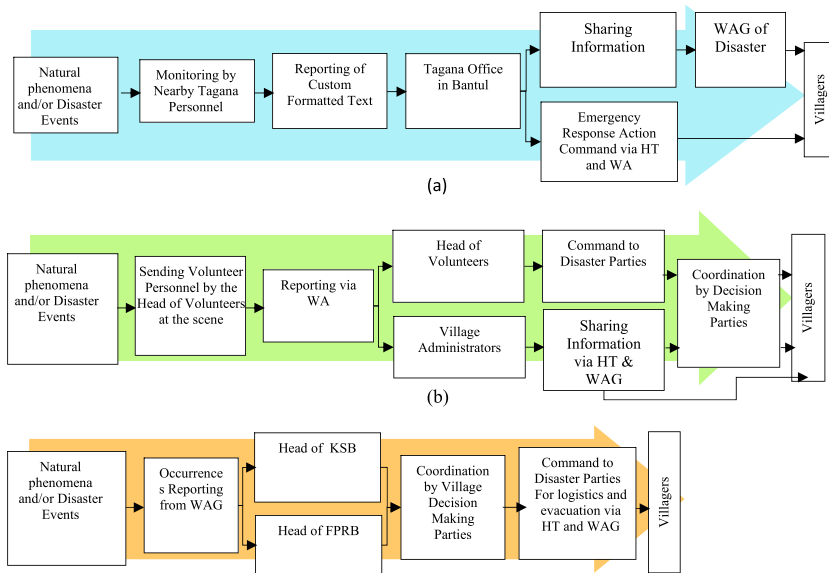Source: Bpbd of special region of yogyakarta with modification, 2019.

Fig. 2. Flow of Disaster Information in Research Locations by: a) Tagana, b) Public Volunteers, c) KSB and FPRB.
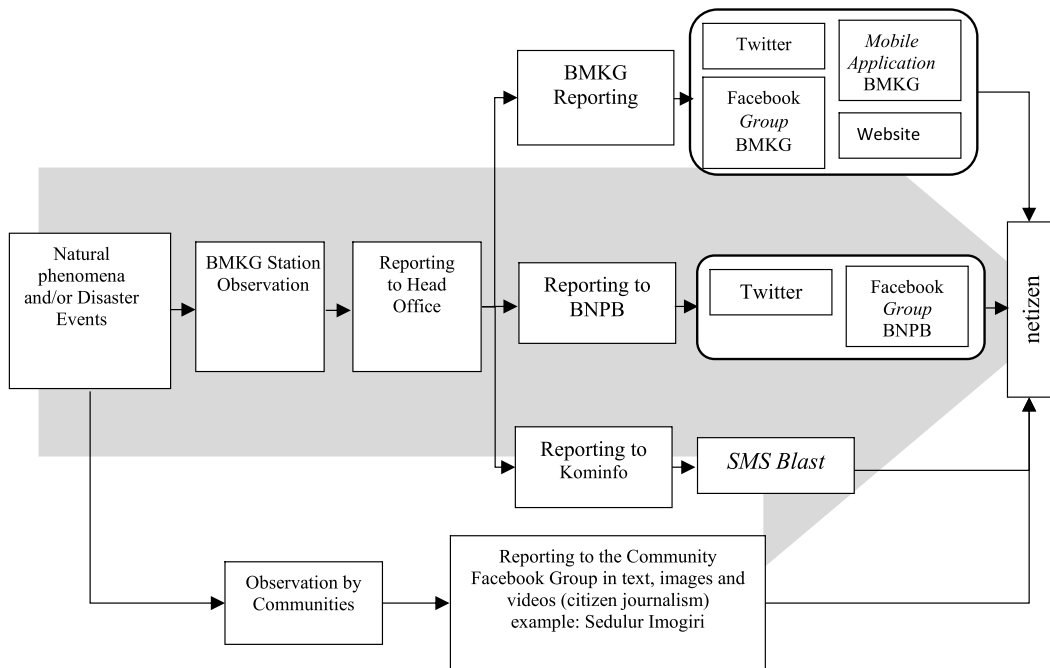

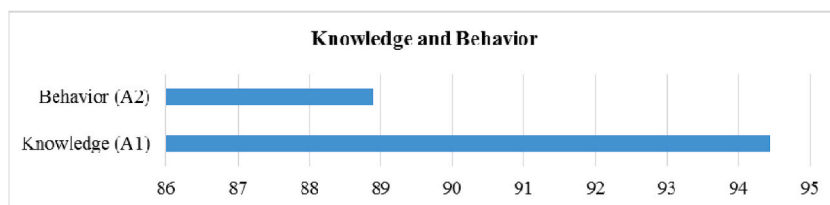**Fig. 3.** Flow of disaster information in social media.

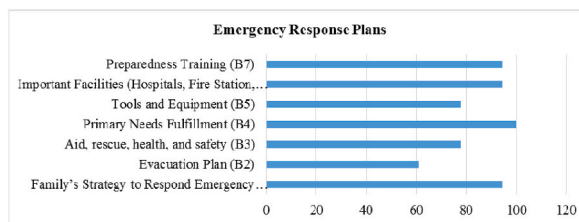**Fig. 4.** Knowledge and behavior factors.

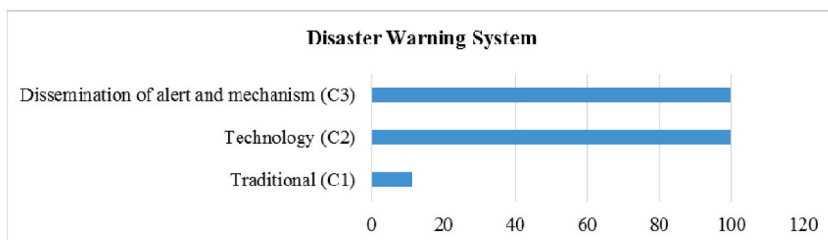**Fig. 5.** Emergency response plans factors.

Fig. 6. Disaster warning system.

a) Knowledge Indicator (A1); Knowledge indicator explains that 94% of informants had an understanding of hydrometeorological disasters as well as the time of occurrences related to floods, landslides, drought, and land fires. This indicator shows that community groups have a good capacity for disaster knowledge.

b) Behavior and Thoughtfulness (A2); 89% of informants had an understanding of actions to take when a disaster occurs. Behavior and care are really connected, as it differentiates the actions of self or other people surrounding. Most people help others when a disaster occurs, as proven by the mobilization of communities' vehicles to evacuate the communities to shelters or safer zones. Other people opt to rescue themselves initially. The preparedness of community groups has the behavior and care to respond to disaster occurrences with good category.

2. Emergency Response Plans Factors (B)

a) Family's Strategy to Respond Emergency (B1); It describes that informants as individuals know what actions to take to save the community from the emergency situation that happened 24 h after. 94% of informants knew the rescue and evacuation strategies while the others could not explain the rescue mechanism, so the emergency preparedness in the community had strategies to respond to emergencies in the good category.

b) Evacuation Plan (B2); Informants understood the actions to evacuate local communities according to their duties and roles. They could show the shelters, assembly points, and accessible routes. 61% of informants knew the community evacuation strategies. Others didn't know the evacuation plans including shelter location and assembly points. However, the overall preparedness in the evacuation plan had a good category.

c) Aid, rescue, health, and safety (B3); Individuals who have disaster alertness should have first aid kits, and skills, and have joined the training of first aid, evacuation, health services, and rescue for local communities. 72% of informants had the tools and could give first aid. The rest of the informants had a lack of idea about first aid and had not joined any similar workshops. Alertness in the community in having first aid, rescue, safety, and health was in a good category.

d) Primary Needs Fulfillment (B4); When a disaster occurred, it is essential to provide enough food, logistics, alternative communication tools, and lighting facilities to overcome an alert situation. All of the informants had this equipment, for example in the food supply, they could provide instant noodles and kinds of biscuits and bread. 11 of 18 informants had HT in proper condition as the alternative communication tool. They also provided emergency lamps and electric torches as alternative lighting sources. A generator set was provided in villages and Tagana's warehouse. The primary needs fulfillment in this indicator was grouped as very good condition.

e) Tools and Equipment (B5); tools and equipment for disaster alert were provided in a disaster emergency bag. This bag has required a minimum of one per family and it includes important documents, emergency lighting, a battery or portable power bank, instant food, a first aid kit, a whistle, a pocket knife, and utensils. These supplies are aimed to fulfill the daily needs for 72 h or 3 days after the disaster occurs until the help comes. 78% of informants had this equipment in a bag that is easy to bring in an emergency situation. The rest of the informants had no disaster emergency bag and had not prepared it. Thus, the tools and equipment indicator show a good category.

f) Important Emergency Call (B6); it is crucial to saving the phone number of important facilities, such as hospitals, fire stations, police, municipal waterworks, state electricity company, telecommunication company, and other relevant parties such as doctors, midwives, and regional agency for disaster management or BPBD (Badan Penanggulangan Bencana Daerah). 94% of informants had the emergency phone numbers for one in minimum, while the others had not. The alertness of the community in this indicator is grouped into very good categories.

g) Preparedness Training (B7): the availability of education and learning topics about disaster preparedness and the execution of preparedness training. 94% of informants understood the education of preparedness and had already experienced the training. Tagana and Social Agency (Dinas Sosial) from the governments give workshops to KSB a minimum of two times a year. Related parties such as Social Agency and BPBD give training to Tagana and FPRB, while other informants have not been involved in any training yet. The alertness of the community in preparedness training is included as very good. Workshop and training methods are considered as ones of effective ways to introduce and increase disaster awareness in a community [37], as long as the involvement of community participation [38].

3. Disaster Warning System (C)

Traditional communication media is communication between people using symbols such as sounds, gestures, visual arts, and folk performances [39]. Traditional communication media support modern mass media to explain information that is difficult to understand for people in rural areas. Including its use as an educational medium in natural disasters that is able to explain how to save yourself when a disaster occurs becomes a reliable source of information in addition to modern communication technology such as early warning system technology that has been installed.

Communication media for traditional early warning systems that have been common in the community living environment are "kenthongan" and "bedug". Kenthongan can be found in each community house or special meeting places such as village halls, hamlet halls, or ronda posts, while bedug can only be found in mosques or mushollas [40].

a) Traditional Disaster Warning System (C1); this indicator explains the existence of conventional information and communication tools, such as oral communication, whistling, and communicating through 'kentongan', a slit drum used in traditional villages to communicate and gather people. 89% of informants had no awareness system and source of information in the traditional way, while the others had this traditional system in the communities.
b) Technology-based Disaster Warning System (C2); all of the informants had information sources through handphones. The preparedness of community groups is categorized as very good.
c) Awareness Dissemination and Disaster Information Mechanism (C3); access to get information on disaster alerts. All of the informants had access (100%) to various sources of information, for instance, news shared in WA groups, online news sites, and Facebook groups. These sources played roles as the media to implement citizen journalism and active participation from the community in reporting emergency occurrences on the group pages. Thus, the preparedness of community groups is categorized as very good.

The key informant as a representative of the leadership of the disaster organization has implemented the five points that are the foundation in building effective disaster communication according to Haddow and Haddow (2008), 1) customer focus, which is understanding the information needed by the community and volunteers, as well as ensuring that the communication mechanism and information are on target and accurate. 2) leadership commitment, the leadership has a commitment to effective communication and is actively involved in the communication process. 3) inclusion of communication in planning and operations, to achieve the goal of inclusive disaster communication requires careful planning involving all elements, especially communication experts actively involved in all emergency planning [41] and operational activities in order to ensure that communication is timely and accurate. 4) situation awareness, effective communication is based on data sources, analysis, and dissemination of controlled information related to disasters, the principle of transparency and trustworthiness is key. 5) media partnership and media cooperation involve understanding the needs of the media with a trained team cooperating to obtain and disseminate information to the public (see Fig. 6).

4. Resources Mobilization (D)
  a) Human Resources (D1); this indicator describes whether the community had received the disaster alertness literature, had understood the disaster alertness, and had the facilities to evacuate communities. 94% of informants told that there were training and simulation with communities, while only 6% had not experienced any related training. Thus, the preparedness in this indicator is very good.
  b) Social Networks (D2); Relatives, family, co-workers, and social institutions who are able to provide assistance during an emergency. The forms of assistance provided include temporary shelter, disaster logistical assistance, medicines, and cash loans for rehabilitation and reconstruction. All informants had family and relatives who can provide assistance when a disaster occurs. The preparedness of community groups in terms of the availability of social networks is included in the very good category (see Fig. 7).
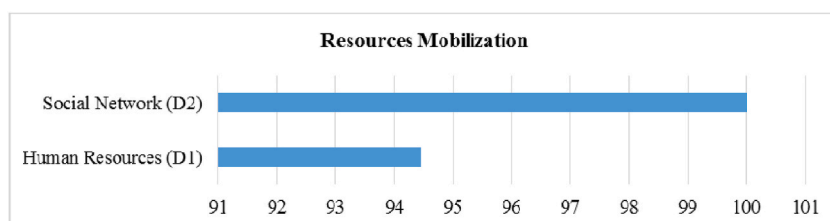5. Social Capital (E)

Fig. 7. Resources mobilization.

a) Organization (E1); The indicator for participation in the organization explains that the informants are members of religious and youth organizations, in addition to positions and livelihoods. As much as 83% were also members of religious organizations such as Aisiyah and youth organizations such as Karang Taruna and biker communities. Youth organization indeed plays vital roles in social development particularly in local scoupe [42] As many as 17% of the interviewees were not affiliated with other organizations and were only involved in their main job and as members of disaster response community groups, but not as administrators or activists. So that the preparedness of community groups in terms of participation in social organizations was included in the very good category.

The existence of a social network is due to mutual knowledge, mutual information, mutual reminders, and mutual assistance in carrying out or overcoming problems. Community groups that have a wide network will provide many benefits for themselves in the future. The social network that is owned can later help when in difficult times [43].

Based on the assessment of the preparedness factor of the community groups in the four villages of Sriharjo, Karangtengah, Selopamioro, and Kebonagung, they were in the good and very good categories in all indicators which include; knowledge and behavior, emergency response plans, disaster warning systems, resource mobilization, and social capital (Fig. 8).

4.3. Preparedness culture as part of community cultures

The recapitulation of preparedness culture data was carried out based on preparedness indicators. It that can be calculated on the intensity and the pattern activities were carried out. This aims to measure whether preparedness has become part of the culture of community life or not. Table 2 shows the results of measuring the indicators of knowledge of disaster events, emergency response plans, human resources, and social capital.

Based on the recapitulation of preparedness indicators in Table 2, the following results are obtained.

1. Knowledge Indicator Related to Disaster Events

The informants consisted of FPRB Sriharjo Village, Kebonagung Village Officials, Kebonagung Village KSB, Karangtengah Village Volunteers, and Tagana Bantul Regency. Based on the results of the FGD, it was found that the informants had knowledge of the intensity of floods, landslides, and fires that occurred in one year. These three types of disasters occur every year with an intensity of 1–2 times a year, but no landslides have been found in Kebonagung Village during the last three years.

2. Emergency Response Plan (Evacuation)

Informants were involved in the process of evacuating disaster victims on average 1–2 times a year. FPRB members, KSB, and volunteers had always been involved in the evacuation process whenever a disaster occurs. Special evacuation sites were provided by the KSB in the multi-purpose building, FPRB in the mosque and the hamlet head's house, village apparatus in the village hall complex, Tagana in the temporary evacuation post, and volunteers in the community center and village field.

3. Emergency Response Plan (Logistics)

Types of logistics in the form of ready-to-eat materials prepared by the village in dealing with an emergency response include; 1) Kebonagung, procured a village granary in 2018, and there had been no renewal of ready-to-eat materials (but a request for renewal of ready-to-eat materials has been submitted). 2) Sriharjo Village collaborated with shops to store ready-to-eat food ingredients to keep them in good condition. 3) Karangtengah village had checked the village barn once. First aid: Kebonagung and Karangtengah did not have first aid supplies (first aid is conditional when a disaster occurs). Sriharjo did not provide first aid because they cooperated with the health center. Emergency lamps and flashlights: Kebonagung updates emergency lamps and generators every year, and Sriharjo Village also updates once a year. Karangtengah Village did not have a special emergency lamp supply for dealing with disasters.

4. Emergency Response Plan (Disaster Warning Information Resources)

The informants obtained disaster information from the internet and HT. They always update disaster information every day, even knowing updates on disasters that occurred overseas.

5. Emergency Response Plan (Disaster Training/Education)
   The informants attend disaster training 1–3 times a year on average. Usually, the training is held by BPBD, PMI, Karang Taruna, and other parties.

6. Disaster Warning Sources

The informant received disaster warnings that occurred in the neighborhood from the WhatsApp and HT groups.

7. Human Resources

The informants had experience contacting the community or other institutions related to evacuation assistance. One example was done by the Sriharjo's FPRB who asked police to borrow a truck with high dimensions to evacuate flood victims in 2019. in.

8. Social Capital

The majority of informants joined disaster organizations or communities in 2017 (after the big flood disaster). One of the FPRB members from Sriharjo joined the disaster community in 1987 (after the previous big flood), while one of the KSB members from Kebonagung joined the disaster community in 2007 (after the DIY earthquake). Based on the preparedness culture assessment, it can be
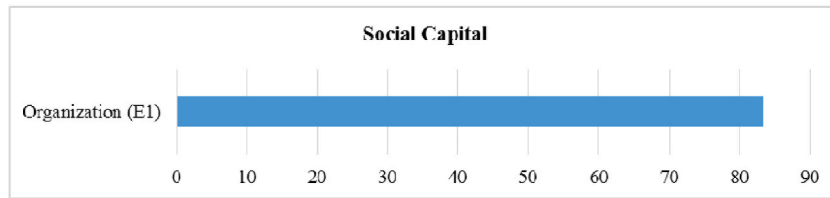
Fig. 8. Social capital.

Table 2
Preparedness culture assessment.

Preparedness Factor	Indicator	Informants																	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	company) (B6)																		
	Preparedness Training (B7)	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3. Disaster Warning System (C)	Traditional (C1)	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-
	Technology (C2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Dissemination of alert and mechanism (C3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Resources Mobilization (D)	Human Resources (D1)	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Social Network (D2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Social Capital (E)	Organization (E1)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-

Notes:
✓ : Available/knows/had/has done it, recapitulation of positive answers according to the type of preparedness indicator
- : Not available/don't know/never did, recapitulation of negative answers according to the type of preparedness indicator

Informants:
A: Head of KSB Kebonagung
B: Village Officer of Kebonagung
C: Police of Kebonagung (Polisi Babinsa)
D: Headman of Kebonagung
E: Coordinator of Tagana Bantul
F: Coordinator of Tagana Imogiri and Wukirsari
G: Secretary of Karangtengah
H: KSB member and health, UMKM, PKK cadre
I: KSB member and community services volunteer
J: KSB member, religion health cadre

K: KSB member and health cadre
L: Head of religion community 'Aisyiyah' and Flood Survivor
M: Kepala Dusun Siluk II, Desa Selopamioro
N: Member of Tagana Sriharjo
O: Member of Tagana Karangtengah
P: Member of Tagana Selopamioro
Q: Member of FPRB Sriharjo
R: Member of FPRB Selopamioro

concluded that even though community groups have preparedness values in the good to the very good category in all indicators, the results of the community group preparedness culture assessment are still relatively low due to the low intensity of implementing community group preparedness activities at the village level within a year, while hydrometeorological disasters occur more than three times a year.

The actors in the disaster awareness groups have not anticipated the conditions when a disaster occurs but they realize they do not have equipment such as emergency lamps, flashlights, and generators and have requested to be facilitated by the BPBD Bantul. Furthermore, they prepare the flow of information in the event of a disaster using traditional tools such as bells, whistles, and beating electricity poles.

5. Conclusion

1. The role of ICT becomes vital infrastructure as a source of disaster warning information for decision-makers in each village. Types of ICT used by almost all stakeholders and potential volunteers at the research sites are phones through the WhatsApp application media with the group chat feature as a fast and easy-to-use communication medium; and Handy Talkie (HT) as an alternative

communication tool held by representatives of community groups and village officials. The role of technology in sharing disaster warning information starts from:

a. Monitoring and reporting the pictures and news related to weather conditions by community groups in coordination with the village administration to be aware of disaster-prone areas.
b. Dissemination of alert information on disaster-prone areas by the central post in the village to the hamlet heads and cadres in each sub-village or Rukun Tetangga (RT).
c. Information dissemination of evacuation and village assembly points to hamlet heads and cadres in each RT.
d. Data collection and reporting of victims affected by the disaster by TRC and Tagana to the central post in the village.

2. The preparedness of community groups has good and very good categories in all preparedness indicators. This shows that the potential for disaster management in the villages of Sriharjo, Selopamioro, Karangtengah, and Kebonagung can be implemented well.
3. The culture of preparedness for community groups in the villages of Sriharjo, Selopamioro, Karangtengah, and Kebonagung tends to be low because the intensity of preparedness at the village level and group level is still carried out once a year, while the potential disasters can occur more than 3 events each year. In addition, the pattern of preparation for preparedness is still conditional. The preparation will only be prepared when it is used in a short time or when the impact of a disaster can already be felt. This is a reflection that the prepared risk reduction efforts are still low.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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