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Crisis Communication in a Natural Disaster: A Chaos Theory Approach

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ABSTRACT

Various studies indicated the need for crisis communications in natural disasters because a disaster can trigger crisis. Disasters that occur in remote areas need a strategised approach and tailored communication plan to suit with the characteristics of the local community. This research uses chaos theory to describe crisis communication and analyses the role of communications during floods in the Klaten region in Indonesia. Flood is often struck in this area. The concepts of chaos theory are analysed during this disaster, such as guidance on the initial conditions, the shock of the situation, the changes of the existing system, and the emergence of a helper. In-depth interviews were conducted with 14 informants from residents in two sub-districts of Klaten and 4 staff in the disaster menagement district office Klaten region (BPBD). The results indicated that although the same catastrophic pattern is observed, people still find it shocking everytime. It was also observed that ideas or strategy to deal with the flood are made spontaneously following the disaster, often in an urgent state. The role of the helper is also very memorable for the community. The communication channel used are informal, face to face and utilising traditional channels. The ability of social media has not been employed by the villagers, particularly the older generation, nevertheless the younger generation could still explore this platform during crisis. Future research can evaluate another important field that appears to be important in disaster communication, which is public diplomacy. This hopefully could explore more asumptions of the chaos theory during disaster.

Keywords: *Disaster, chaos theory, flood, crisis, crisis communication.*

INTRODUCTION

Many scientists have identified the important role of communication in crisis conditions (Ferguson, Wallace, & Chandler, 2012; Oliveira, 2013; Lauzen, 2016. However, not many scientists study in the context of natural disasters (Critchfield et. al, 2006; Gultom, 2016; Horsley, 2006; Juneza & Purworini, 2016; Spence, Lachlan, & Griffin, 2007; Sellnow, Seeger, & Ulmer, 2002). Therefore, more research are needed to examine crisis communication in dissasters in order to find solutions that can have a positive impact on natural disasters.

The disaster itself, according to Law Number 24 the Year 2007 on Disaster Management (Badan Nasional Penanggulangan Bencana [BNPB], 2015) is defined as:

> …an event or series of events that threaten and disrupt people's lives and livelihoods caused by natural factors and/or non-internal factors and human factors resulting in human casualties, environmental damage, property loss and psychological impact.

The definition indicates that disaster can cause physical and psychological harm (Ahmad & Lateh, 2018). Therefore, disaster needs to be handled carefully, not only through aspects of facilities and infrastructure but also strategic communication. This also relates to

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the use of the local values in communication among disaster victims (Mustaffa et al., 2018). Disasters also require attention from various parties, ranging from government officials, villagers, village leaders, non-governmental organisations, media and various other parties.

Natural disasters are one of the most frequent and unavoidable events, especially in areas that are prone to disasters. Natural disasters may turn into crisis because it is unpredictable and uncertain. Therefore, fast and accurate spreading of information is needed (Taylor & Perry, 2005).

The National Hurricane Center, The Caribbean Hurricane Page, and the National Weather Service use an internet-based crisis communication strategy, to form a discussion of the storm system. The Caribbean Hurricane Page also posts links to inform the most active or threatening storms and offers information to local news correspondents. They also provide reports and messages from local correspondents who experience storms through postings that are constantly updated as well (Sellnow et al., 2013).

The communication strategies undertaken by each disaster-handling agency will differ from one another. It also has to consider the socio-cultural worldviews and behaviours of people disasters's management (Moorthy, Benny, & Gill, 2018). This is because people have different social and cultural beliefs, as well as other characteristics that make them need to be approached with the right approach (Eiser et al., 2012).

The role of communication in the disaster myths also become an issue in the study conducted by Baker (2016). In her study, Baker emphasises the need of attention from the disaster management institutions to identify inherent skills and potency of community that affected by disaster.

Crisis communication is a process of sharing information related to crisis condition that is conducted among organisation and its stakeholder in order to reduce the negative impact of crisis (Purworini, 2016).Therefore, it is common that the communication during crisis is needed more compare to normal condition. In addition, in disaster situations when uncertainty and panic, effective communication is more difficult to be conducted compared to normal conditions. This condition should be anticipated by using many communication channels for the alternatives.

This study aims to explain the role of communication in disaster conditions. Using a qualitative approach, this study captured the role of communication during the flood disaster in Klaten region. This research is expected to answer the need for qualitative research in crisis communication conducted between organisation and stakeholder-based in local context (Lee, 2009).

This study focuses on the flood disaster that occurred in Klaten district. Research conducted by Tauhid et. al (2017) found that the risk in Klaten can be classified into very low risk (16.31%), low risk (33.01%), medium risk (34.49%), high risk (14.22%), and very high risk (1.97%). With so many disasters, Klaten has even been a pilot program of disaster risk reduction at the national level (Koran Sindo, 2016).

The handling of disaster management in Indonesia is managed by disaster management district office (Badan Penanggulangan Bencana Daerah - BPBD) located in every region. The BPBD Klaten District can be stated as very professional due to its experience in handling various disasters. It has a strategy that continues to be developed to handle disasters from before, during and after the disaster. In practice, BPBD has important information that needs to be understood by the villagers. Likewise, people have information about the disaster they are experiencing. So both parties, namely BPBD and the villagers have a two-way

relationship in the context of disaster communication. Each party is the producer and recipient of disaster-related messages.

The villagers who live in Klaten has unique characteristics that requires BPBD Klaten to look for various alternative communication patterns to reduce losses due to frequent disasters, in particularly floods.

LITERATURE REVIEW

Chaos Theory in Disaster Communication Studies

Chaos theory is one theory used to photograph disaster. The theory of nonlinear themes is initially applied in many fields of engineering, physics, medicine, biology, economics etc. (Tobin, 2016). In the midst of crisis communication, this theory is then also used by some scientists to study the disaster. Although it has important potential in crisis communication studies, this theory has not been widely used (Horsley, 2010). Among those are Kiel (1995), Sellnow et al. (2002), Piotrowski (2006) and Sellnow et al. (2013).

Chaos theory in this study refers to the definition mentioned by Sellnow et al. (2013). Sellnow et al. (2013) suggests Chaos Theory is an approach that emphasises the elements of interactivity and unpredicbility instead of using a linear approximation pattern that focuses on causation. In chaos conditions, where risks and issues arise full of uncertainty, it takes the organisation's accuracy in providing responses that can be understood by all parties.

The response has the potential to create a disturbance in the existing system, but the results appear difficult to predict with certainty (Sellnow et al., 2002). Chaos theory describes the complex system that can be seen from the dependence on the initial conditions (*butterfly effect*), *bifurcation* (systematic change when the crisis occurs), *cosmology*, *self-organisation* (a consequence of bifurcation), *fractals* (a function of perspective) and *strange attractors* (Sellnow et al., 2002).

Chaos theory hold the principle that it is imposible to have an accurate and precise communication of the behavior in complex systems. Therefore it is risky to depend on initial condition in crisis situation. The bifurcation usually occur in the complex systems where vulnerabilities easy to build up. The systematic breakdowns involve a process of bifurcation that most often leads to self-organisation, unplanned behavior that differ from the usual pattern. In this chaotic conditions, sometimes stimulate individual, group or organisation to support the community based on norms and traditions in moving out from the crisis (Sellnow et al., 2013)

Chaos can occur in nonlinear systems. Nonlinear systems have relationships between variables that are volatile and irregular, when small errors occur, it can cause massive losses (Kiel, 1995). Moreover, these information should become consideration when managing disaster. The high level of uncertainty sometimes can not guarantee that careful preparation will create no harm impact.

METHODOLOGY

This research used a qualitative descriptive method. The constructive approach was used as the theoretical foundation in this research because the aim of the researcher is to understand the experience and subjective expression of the resource person.

The unit analysis consists of villagers who live in disaster prone areas and also staffs in BPBD Klaten. The informants were selected by using snowball sampling through informant's suggestions. This could give recommendations of having informants that provided rich

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information since there were lack of information related to the case. There were two districts that were investigated; Bayat and Wedi.

Data was collected by conducting face to face interviews with 14 villagers living in Patoman, Jiwo Wetan, Tegal sari, Paseban, Pacing Lor village and also with 4 informants from the BPBD Klaten region. All the informants participating in the in depth interviews was asked the same list questions. Multiple data sources were included in this study, enabling source triangulation. These data sources encompassed intensive interviews with villagers, staffs of BPBD Klaten region and also a review of BPBD documents and online news articles relate to flood disaster in Klaten.

For this study, the first stage was to transcribe narratives from in-depth interviews with all informants. The statements were sorted and grouped into koding sheet. The second stage was reviewed the transcribe narratives in order to find out the code that view the concept of chaos theory : *fractals, bifurcation,* and *strange attractors* (Sellnow et al., 2002).This deductive coding allowed the researchers to save time in finding the concept appear in the transcribe (Yin, 2011). The organised data were reviewed and analysed again in order to form a displayed data suit to the research question. During this data analysis process, the matrix method proposed by Miles & Huberman (1994) was used. This method started from data reduction stage, data display, formed conclusions and validation. The matrices in the final anaysis already included from multiple data source.

RESULTS

Chaos theory offers important concepts capable of portraying communications in disaster conditions. Therefore, this theory is suitable to explain the dynamic behavior that occurs in all disaster stakeholders, in this study the staff of BPBD and disaster victims. To serve the purpose of this survey, the basic concepts of Chaos theory will be analysed, by breaking down the concept of fractals, bifurcation, and strange attractors.

Fractals

Under chaotic conditions, according to Steward (Sellnow et al., 2002), one of the most important concerns needs to be focused on the behavior of people who constantly assess conditions as appropriate to the initial conditions.

This perception is certainly dangerous if always done in a disaster condition. Unsurpassed and unpredictable communications response to communications can make a shock to humans. When what happens is not all with what is predicted, then the confusion will increasingly reach.

During the flood disaster that occurred in Klaten, fractal occurs when there is a perception that the flood will not go into the area of the house, only upon farmland only. But as the water rises and the rain does not stop, water gets into the house and makes people panic.

In reality, the villagers have done renovation after the disaster took place, by repairing the dike, justifying the ditch, fixing the irrigation, but the flooding still occurs due to water debt and rain time that cannot be insured.

From the explanation of villagers informants, it can be described if fractals occur in the pattern of a belief in the method of disaster information resources, which seems to suggest that there is a similarity between flood patterns from year to year. Similarly, when the informants of BPBD perceive that village head already see the threat of floodings that

occurred, such as trying to get hold of the dikes that can be produced and can be reinforced by planting trees or bamboo.

Under flood conditions, some villagers usually wait for instructions from government officials when appropriate time. 6 informants waited for instruction and the others did not.

> Yes, if asked whether I have been displaced or not, I have answered once. The last flood was water entering the house up to 30 meters. So I also consulted with Mr. RT (leader of one village group),, Mr. RW (leader of several village groups), and my neighbor... (Informant 2).

The determination to evacuate or not for some people is not easy to answer. Moreover, they have often experienced floods so they feel able to forecast what the weather pattern will be like when the rainfall passes. They also adhere to the water point. When it is not entered into the boundary of the home, they will stay. Whereas high water is also influenced by the height of the house building. It is worried that if they judge the water has not gone into the house, the peril of flooding has not been lurking while the rising tide has actually happened.

> We inform according to how much rain, moderate or heavy. If it rains for up to 5 hours there will be a threat of flooding or overflow. If it's less than that, it's declared safe. If it has been more than 5 hours, we must inform standby, especially to the community and volunteers, in areas that are threatened by flooding (Informant 18).

Information is usually distributed by BPBD using the telephone or Handy Talky. The TRC team from BPBD (Quick Reaction Team) will coordinate village volunteers in case of disaster. BPBD acted to reduce the fractal that occurs in the villagers. Floods cannot be underestimated or even speculated from gauging the water release. Moreover the chaotic conditions, no matter how little, the water can be a major hazard due to various other uncertain conditions.

In accession to the perceptions of floods that are believed to cause similar forms, other fractals come from the feelings of villagers that they already have preparations if disasters do. The informants in this study responded that they were preparing but little explained how they were prepared. They tend to focus on evacuation when disaster strikes.

The closeness between the individual and the neighbours is very important in crisis communication in Indonesia (Abud, 2013). The common language and communication patterns of villagers can be a driving force for the distribution of information for communities living around Mount Merapi, Klaten (Gultom, 2016). Those findings also corroborated by information from the informants in this study. They have a close communication with neighbors. They talked about disasters at various informal events, such as in *arisan* conducted by fathers and mothers of each family grop (certain informal gathering suit to ages, family, or background), after prayers at the mosques, or crowding at crossroads.

The closeness and ease of getting information, become a belief that makes some people not sharing disaster information with neighbors before the floods hit. They assume that their neighbors must already know the same information as them. Only eight informants claimed they told neighbours that the floods would come soon or come, while the other 6

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answered the do not mind to. Such perceptions need to be changed with the assumption that information needs to be disseminated immediately.

What's more, in a state of panic and confusion in chaotic conditions, people will focus on themselves and family. According to Sellnow et al. (2013), values, needs, objectives, threats, and dependencies may be frozen under conditions of crisis. Frozen in the means of feeling shock because the situation is beyond the initial estimate.

In addition to relying on data center information, BPBD Klaten District also gets disaster information from various parties.

> .... yes through the media here, there is information Centre of information and operational data (PUSDAROP). If there is a threat of the weather forecast, the mass media will access it. From the process of PUSDAROP spread, WA groups in each district automatically spread to the villagers. Media such as print and online will usually come here preparations about each season to access news about the season (Informant 18).

Most informants (10 villagers) find out about the surrounding weather conditions when the weather is not conducive. As for information they usually get from television (8 villagers), from social media (4 villagers) and 2 others find out to others.

The information indicates if they rely more on disaster information than traditional mass media. They have not used many social media, such as Twitter or Facebook, which facilitate the dissemination of information. This can be understood as informants who answer using social media are informants under the age of 35 years and students or workers in the city.

Some informants who understand the technology, claiming to use whatssap to exchange information about the disaster.

> ... when floods come, we also communicate via whatsapp groups. We can monitor our situation and condition each other's (Informant 3).

Bifurcation Points

a) Cosmology Episodes

An interesting finding that researchers found out is that BPBD personnel are constantly on standby when the rainfall comes. They monitor the movement of water and have a concern for villages that are often flooded. Although they have personal limitations, they coordinate with mobile field teams to look at locations prone to flooding.

Flood disasters have difference characteristic compare to earthquakes or erupting volcanoes that occur in Klaten. Floods in this area tend to be more easily monitored so as not to cause casualties. Nevertheless, the floods that occurred in Klaten in 2017 up to 6 districts were inundated, and even many residents in Wedi and Bayat villages had to flee because their villages were isolated puddles.

Cosmology that emphasises the shock or difficulty to accept the real condition is not much visible from the statement of informants (BPBD staffs). This comes about because of their readiness to monitor the motion of water discharge so as to experience the motion of water.

> When a disaster not, then we are preparing the personnel, the equipment of the mechanism of the handling mechanism... (Informant 16).

The information was also reinforced by another informant. As stated below :

> ... yes, we use information from the Centre of information and operational data (PUSDAROP). So, if there is a forecast threat of the weather, the journalists will access there, from the process of PUSDAROP, then it will be spread through *Whatsapp* groups in every district automatically, then spread to the residential area. The journalists usually come here to receive the information in each season (Informant 18).

The statement suggested that the disaster still had an element of uncertainty and there was no guaranty of protection. All bad things could occur. This were also appeared from the statement of the informants. There were 13 informants from communities who admit that they felt sad, afraid of, and confused. Only 1 informant who did not feel that.

> I was really afraid because the water went into my house (Informant 6).

> I felt afraid, I stayed in my home, because I felt confused to go out (Informant 10).

From the information given by the informants, it turned out that both men and women also remain afraid when the floods came. The disarray and uncertainty related to their *cosmology* period would also continue when they decided to evacuate. According to informant 4, former leader of RT who already led for many years,

> I always feel sad, because many villages were flooded and seeking help was also difficult (Informant 4).

> ... yesterday I only saw water going up continuously, until 3 new days receded. There was a post in Brangkal village. Yes, I left the house to help find food for the villagers. This was because in one day sometimes new rice packets were sent at 5:00 p.m. Sometimes we reported at 7:00 a.m but we only got rice at 5:00 p.m. Yes, fortunately there were neighbors who had rice, so we cooked together with the villagers using limited ingredients that we had (informant 10).

The villagers were of course anxious about their possessions as well as their health. Moreover, most of their livelihoods were farmed so that floods that put down their agricultural land would surely harm them.

> ... we sometimes discussed the floods in the mosque, after having *sholat*. We got the flood information, which area that already full of water. It was very sad because we could not harvest our plant due to flooding. Thus, we hope that all flood victims can get planting aid (Informant 10).

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When the floods have subsided, the villagers returned to their daily activities. But they still feel anxious and worry about flooding again. This is because they realise that they live in a flood-prone area while on the other hand, they cannot manage the weather according to their expectations.

b) Self-Organisation

When floods occur, villagers, leader of *RT, RW*, *lurah* (sub-district), volunteers, NGO, and staff of BPBD were always coordinating, especially when the dike water increased.

> Last flood that occured in January or February, 2018. Villagers in Pacing and Bayat were also partially displaced by inundation. ... we refer to *SAR* (Search And Rescue), friends from the NGO such as *SENKOM community*, *Muhammadiyah community, BANSER*. So this was good because there were communities in these villages. For example there was a KOKAM representative who lives in a certain village, later when a flood occurs, it would be faster in providing information. Likewise, there were also representatives of BANSER members in another villages… (Informant 19).

In addition to the presence of communities that played a very important role in facing floods, there were still community villagers who without waiting for orders from the leader of *RT* were active in finding food for the needs of the community. It was interesting that when disasters occur, new efforts emerge from their the villagers (Horsley, 2006).

According to staffs in BPBD Klaten region, it was not easy to cope with flooding considering they have limits to deal with flooding sources. When a flood occurred because the dike was no longer able to withstand the water debt, BPBD has no authority to handle. They only had the obligation to report and gave a recommendation to the institution that has the authority to make improvements ie the Public Works Department.

This condition was actually a barrier for villagers to get solutions from the floods that they often face. Although the problem was well-defined and well-known, it was necessary to wait to be in occupation with the government's policy.

Furthermore, the embankment problem did not then make the concern of volunteers from several NGOs and BPBD recede. BPBD has been even always ready with a public kitchen that can quickly prepare hundreds of foodstuffs, even for all personnel who assist in the line of business.

The BPBD team also had communication arrangements that did not always comply with the standard rules of the agency. They actually established informal communication with several parties connected to the disaster.

> Overall all parties must be involved in handling disasters. Starting from the technical service I mean, the government, both central, provincial and district including from the sub-district, equipment, volunteer friends, staffs, must all be involved if we talk about pre, preparedness until post-disaster (Informant 16).

Klaten BPBD had very much experience managing this flood. They had special ways to establish positive relationships with volunteers from various NGOs or individuals. By having meeting regularly, both informally and formally, it could increase their relationship more tight and positive.

In a disaster situation, working and communicating with many people were not an easy task. BPBD teams were able to self-organise through personal approaches that make them close when working together in disaster conditions. However, in terms of coordination it is not the same when there flood occurred in different years. Every volunteer or NGO, and the villagers, created self-organising according to their own perceptions so as to create an unpredictable pattern of communication, interaction and response structure (Piotrowski, 2006).

Informants admitted that when the floods hit, 6 people admitted to saving things, 3 people around the village checked the condition and 5 others helped their neighbors. Helping neighbors was certainly not an obligation as they would generally focus on their own needs, but the high local value of villagers, such as empathy and *gotong royong* (is a form of informal cooperation among villagers on the basis of a sense of caring to achieve certain goals), encouraged them to care about others without coercion or instruction from others.

> I took care of my work merchandise and then helped affected neighbors (Informant 8).

> If the flood came, usually young people went around the village. They were also on guard and saw which villagers needed help (Informant 3).

The effort to go round and helped the neighbor were a self-organising form. Self-organising efforts by various parties when disaster and post-disaster were able to generate communication lines and unexpected response structures (Koehler et al., 1997). Of the people who were usually passive, they became more active by showing their concern when the flood stike.

c) Strange Attractors

Crisis attracts many attention from self-organising groups. They can come from certain individuals or groups who are ready to go to the location. Therefore, their presence needs to be accommodated in the entire disaster management process (Sellnow et al., 2013). This is done so that there is a real form of attention they have shown.

In a disaster condition, everyone who actively helps the villagers were of concern. The presence of the BPBD team with their orange uniform was not recognised by all villagers. However, their presence provided an extra spirit for the villagers. The villagers also mentioned that there was help from Muhammadiyah and SAR personnel even though they did not recognise the personal identity of the team coming. They only understand that they were coming to help them.

> So if disaster came that, there were helped from BPBD and also Mr. Camat (the head of district). the government's disaster response was immediate. when residents report, they come immediately (Informant 3).

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> There was also assistance coming from Bayat volunteers. I did not know whether they were officially or not.... But yesterday, there were members of the DPR RI from certain parties coming here too (Informant 14)

One interesting finding came from the residents regarding the arrival of one of DPR RI (the Indonesian House of Representatives) members to their village. The active role of the various parties became attractors in a disaster condition. Their presence of open communication with the villagers showed that many parties were concerned with the flood victims.

Assistance provided by the donors did not make the BPBD Klaten region feel left out. This was even more open communication opportunities that have the same goal of helping the villagers. No rivalry wanted to be the foremost, but how to work hand in hand to reduce the impact of the disaster.

DISCUSSION

The flood occurred in the Klaten area proves that the routine disasters still need to be improved because it has the potential of uncertainty, irregularity and difficult to predict. Chaos conditions that are not dealt seriously and slow response can potentially be detrimental on a large scale.

Fractals can be reduced when villagers and the BPBD always see the disaster from wide spectacles i.e: that disaster is not easily controlled and potentially life-threatening. By looking at the negative impact, then the perceptual experience of the disaster will encourage them to do more preparation, moreover, flood is a tragedy that occurs every year.

Chaos theory recommends that uncertainty can not predict the impact. This also appeared in the findings. Most of the villagers still hold on the perception that the flood impact would be the same to previous flood *(butterfly effect)*. This should be explored more since uncertainty in disaster condition could be changed into chaotic condition that is not easy to be managed.

The reluctant to evacuate also consistant with the finding of Donovan (2010). In his study on volcano eruption in Merapi Mountain (located in Klaten region also), he found out that the perception and response to an eruption are mostly influenced by villager's previous experiences. Their experiences may put them into problems since it gave them a false sense of safety.

Viverita et al. (2014) found that the preparedness of society in disaster prone area is influenced by villagers' values cohesiveness. That value is supported by the communication systems that conducted by local government and the willingness to help each other.

The chaos theory, furthermore, describe that the degree of control is less important in dealing with crisis. Hence, the personal character matters a lot. The rule order in the BPBD should not only be based on rank and administrative eligibility, but also look at the staff morality side. In dealing with a disaster that is risky, there are ethical values that arise, which remain a consideration in carrying out duties and as a person (Bowen, 2009).

Villagers have made efforts to repair the dikes, and hope the government can immediately provide assistance with building embankments. Meanwhile, from BPBD's side, it is true that the longer response to crisis resolution will make people blame the government (Critchfield et al., 2006). This condition confuses villagers. Communication between departments in government needs to be done as soon as possible. It will be better if diplomacy involves representatives of local villagers.

The villagers in Klaten region are bonded with social and local culture. Obviously, it is not difficult for the village's leader to rally them to reconstruct the damaged environment after the tragedy. The local residents' willingness to move can also be performed using the norms and customs adopted by the villagers. Communication thus serves to drive the process toward this improvement (Sellnow et al., 2013). This finding enriches chaos theory that the local culture and values of society influence the management of chaotic conditions

In this process, what occurs in the Klaten emphasises the use of face-to-face communication and community voluunterism (*gotong royong)*. Crisis is sometimes carried high and uncertain threats so that fast and accurate information is needed (Taylor & Perry, 2005). The information is circulated through several phases of communication media, ranging from mouth-to-mouth, mass media, the Internet, or socialidation programs. The use of various communication channels, both media and non-media needs to be done because the villagers have diverse characteristics related to the selection of information resources. They will choose sources that are believed to provide accurate and useful information *(cosmology).*

In this study, traditional and face-to-face communication media are important factors in providing critical disaster response information and at the same time encouraging post-disaster self-reliance processes *(self organisation)*. Providing *kentongan* (traditional communication equipment in the form of a bat made of bamboo or teak wood to give a certain sign or message) and announcing the information through loudspeakers in mosque,etc, can be an alternative solution to reactivate the disaster warning. This medium does not require signal and electricity; hence it can remain to be empowered when infrastructure conditions are broken.

The motivation to seek disaster information is an obligation of every villagers, however, not all villagers know it. They have different perceptions related to crisis level (Purworini, Kuswarno, Hadisiwi & Rahmat, 2017). Therefore, there needs to be an identification of the influence of motivation and interest in the use of information. People will increasingly seek information with information that they find interesting (Spence et al., 2007). The problem related to evacuation information and the food center during the disaster can be answered by an integrated information center that is socialised to all villagers, NGO, volunteers and also BPBD.

The emergence of an attractor , such as volunteers from Muhammadiyah, NU and others in a disaster is very impressive for the villagers (*strange attractors*). Some of them seem to know who is helping them and this should be followed up by the government to continue to encourage the emergence of *strange attractors* when disaster strikes. Providing clear and accurate information to the wider villagers can give rise to the desire to be an attractor.

CONCLUSION

Informal communication has a significant part in the flood disaster in Klaten area. BPBD Klaten has built a good informal communication with volunteers and the villagers. This indicates that in chaotic conditions, set principles or systems can hamper the operation of disaster management. BPBD as a government agency should continue to be given a flexibility to determine the pattern of communication and patterns of self-identification in accordance with the social and cultural factors in the local region.

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A more equitable socialisation in the villagers needs to be amended since they lean to be more passive in getting up the disaster. This can be researched further in future research. The ability of social media has not been employed by the villagers, particularly the senior singles, nevertheless, the younger generation could be supported to practice this. The shared information then can involve all the villagers member, not just the older man.

A limitation of this study is the limited number of younger informants. Hence, deeper information relates to their perception and involvement have not fully identified until now. This research opens opportunities to examine important communication aspects of disasters, such as public diplomacy of government official who is managing disaster. This is important since the policy or approach taken by the goverment has an important role in reducing risk. Applying public diplomacy during disaster from chaos theory lenses, will be useful in creating the most effective responses and recovery on prevention, mitigation or post disaster.

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REFERENCES

Abud, M. (2013). Indonesia: Crisis communication channels (Case studies in humanitarian communication preparedness and response). *Internews*, 1–72.

Ahmad, J., & Lateh, H. (2018). Media and the environment in Malaysia: An analysis on news coverage of landslide disaster in Kuala Lumpur. *Jurnal Komunikasi: Malaysian Journal of Communication*, 32(2), 525–544.

Baker, N. D. (2016). Making it worse than what really happened: Social chaos and preparedness as problematic mythologies in disaster communication. *Perspective*, 1(May), 2011–2014.

Badan Nasional Penanggulangan Bencana [BNPB]. (2015). Definisi dan Jenis Bencana. Retrieved April 19, 2016, from http://www.bnpb.go.id/pengetahuan-bencana/definisi-dan-jenis-bencana

Bowen, S. (2009). Ethical responsibility and guidelines for managing issues of risk and risk communication. In D. O'Hair & R. L. Heath (Eds.), *Handbook of risk and crisis communication* (pp. 343–363). Madison Ave: Taylor & Francis e-Library.

Critchfield, A. J., Oti, D. A., Sun, W., Vance, D. C., & Carter, H. H. (2006). Crisis communication and cultural constructions of calamities: Preparedness in Guyana, Thailand and the United States. Retrieved December 1, 2018, from https://www.sylff.org/support_programs/past_programs/pastinitiatives/

Donovan, K. (2010). Doing social volcanology: Exploring volcanic culture in Indonesia. *Area*, 42(1), 117–126.

Eiser, J. R., Bostrom, A., Burton, I., Johnston, D. M., Mcclure, J., Paton, D., … White, M. P. (2012). International journal of disaster risk reduction risk interpretation and action: A conceptual framework for responses to natural hazards. *International Journal of Disaster Risk Reduction*, 1, 5–16.

Ferguson, D. P., Wallace, J. D., & Chandler, R. C. (2012). Rehabilitating your organization's image: Public relations professionals' perceptions of the effectiveness and ethicality of image repair strategies in crisis situations. *Public Relations Journal*, 6(1), 1–19.

Gultom, D. I. (2016). Community-based disaster communication: how does it become trustworthy?. *Disaster Prevention and Management: An International Journal*, 25(4), 478–491.

Horsley, J. S. (2006). *Reliability in chaos: Crisis communication in state emergency management agencies*. Chapel Hill: University of North Carolina.

Horsley, S. (2010). Crisis-adaptive public information: A model for reliability in chaos. In W. T. Coombs & S. J. Holladay (Eds.), *The handbook of crisis communication* (pp. 550–567). USA: Blackwell Publishing Ltd.

Juneza, D., & Purworini, D. (2016). Respon para disabilitas terhadap komunikasi krisis BPBD (Badan Penanggulangan Bencana Daerah) dan tim SAR Klaten tahun 2016. *Profetik*, 10(1), 80–96.

Kiel, D. L. (1995). Chaos theory and disaster response management: Lessons for managing periods of extreme instability. In *What Disaster Response Management Can Learn From Chaos Theory* (pp. 1–20).

Koehler, G. A., Kress, G. G., & Miller, R. L. (1997). What disaster response management can learn from Chaos theory. In *Conference Proceedings of May 18–19* (pp. 1–34). Darby, PA: Diane Publishing.

E-ISSN: 2289-1528
https://doi.org/10.17576/JKMJC-2019-3502-03

Koran Sindo. (2016). Klaten jadi daerah percontohan. Retrieved from http://koran-sindo.com/page/news/2016-11-14/5/12/Klaten_Jadi_Daerah_Percontohan

Lauzen, M. M. (2016). Image repair: A case study of Thierry Frémaux and the Cannes film festival. *Public Relations Review*, 42(1), 170–175.

Lee, B. K. (2009). Crisis, culture, and communication. In P. J. Kalbfleisch (Ed.), *Communication Yearbook 29* (29th ed., pp. 275–310). New Jersey: Taylor & Francis e-Library.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis* (2nd ed.). Thousand Oaks, CA: Sage Publications Inc.

Moorthy, R., Benny, G., & Gill, S. S. (2018). Disaster communication in managing vulnerabilities. *Jurnal Komunikasi: Malaysian Journal of Communication*, 34(2), 51–66.

Mustaffa, C. S., Ahmad Marzuki, N., Khalid, M. S., Sakdan, M. F., & Sipon, S. (2018). Understanding Malaysian Malays communication characteristics in reducing psychological impact on flood victims. *Jurnal Komunikasi: Malaysian Journal of Communication*, 34(1), 20–36.

Oliveira, M. D. F. (2013). Multicultural environments and their challenges to crisis communication. *Journal of Business Communication*, 50(3), 253–277.

Piotrowski, P. (2006). Hurricane Katrina and organization development: Part 1 (Implications of chaos theory). *Organization Development Journal*, 24(3), 10–19.

Purworini, D. (2016). *Komunikasi krisis dalam konflik internal Karaton Surakarta Hadiningrat: Studi kasus interpretif tahun 2014-2016*. Bandung: Universitas Padjadjaran.

Purworini, D., Kuswarno, E., Hadisiwi, P., & Rahmat, A. (2017). Crisis communication in an internal conflict: A social constructionist perspective. *Pertanika J. Soc. Sci. & Hum*, 25(S), 1–10.

Sellnow, T. L., Seeger, M. W., Seeger, T. L., Sellnow, M. W., Sellnow, T. L., Seeger, M. W., … Sellnow, M. W. (2013). *Theorizing crisis communication* (1st ed.). West Sussex: John Wiley & Sons Inc.

Sellnow, T. L., Seeger, M. W., & Ulmer, R. R. (2002). Chaos theory informational needs and natural disasters. *Journal of Applied Communication Research*, 30(4), 269–292.

Spence, P. R., Lachlan, K. A., & Griffin, D. R. (2007). Crisis communication, race, and natural disasters. *Journal of Black Studies*, 37(4), 539–554.

Tauhid, C. D. K., Fathani, T. F., & Legono, D. (2017). Multi-disaster risk analysis of Klaten regency, Central Java, Indonesia. *Journal of the Civil Engineering Forum*, 3(3), 135–148.

Taylor, M., & Perry, D. C. (2005). Diffusion of traditional and new media tactics in crisis communication. *Public Relations Review*, 31(2), 209–217.

Tobin, P. (2016). *An introduction to chaos theory*. Retrieved from https://pdfs.semanticscholar.org/c60c/a70e73c09b0e7dba764704d4176db90d9000.pdf

Viverita, Kusumastuti, R. D., Husodo, Z. A., Suardi, L., & Danarsari, D. N. (2014). Households perceptions on factors affecting resilience towards natural disasters in Indonesia. *The South East Asian Journal of Management*, 8(1), 13–28.

Yin, R. K. (2011). *Qualitative research from start to finish*. NY: The Guilford Press.