ROLES OF INTANGIBLE CULTURAL HERITAGE IN RELATION TO DISASTER RISK REDUCTION IN BANTUL DISTRICT, SPECIAL REGION OF YOGYAKARTA, INDONESIA

Benny Usdianto [1], Fransiskus Asisi Sukoeksi Widanto [1], Agatia Wenan Tyawati [1], Laras Aridhini [1], and Masami Okabe [2]

INTRODUCTION

The Bantul District in the Special Province of Yogyakarta, Indonesia, lies in the active subduction zone of the Indo-Australian and Eurasian tectonic plates, with its southern side adjacent to the Indian Ocean. According to the Local Disaster Management Office of the Special Region of Yogyakarta (2021a, 2021b), the geological position of Bantul, coupled with its geographical location, leads to occurrences of some natural phenomena such as earthquakes, tsunami, volcanic eruption, floods, and extreme weather.

Earthquakes are recurrent and affect the life and livelihood of local people. The last earthquake on the 27th of July 2006 had major impacts on Bantul. Past distant disaster events are not easy to locate in records but are transmitted through mythology, old scripts[3], or songs (Reid, 2012). Such transmission indicates that intangible cultural heritage (ICH) plays important roles among the people for continuous knowledge of disaster in their vicinity and the probability of its reoccurrence in the future. ICHs, commonly referred to as *kearifan lokal* or local wisdom (Aldiansah, 2021), are known among disaster management (DM) practitioners. After the tsunami in Aceh in 2004, DM practitioners, academics, and other associates in disaster risk management (DRM) activities have paid increased attention to ICH, such as popular the *smong* in Simeulue Island (Suciani et al., 2018).

According to the Population and Civil Registration Office of the Bantul District (2022), the population of Bantul is 964,245 (479,742 males and 484,503 females). The entire population faces earthquake threats. The active Opak faults crosses Bantul from the south to northeast and causes recurrence of earthquakes. The earthquake that occurred in 2006 claimed over 5,000 lives and devastated/damaged thousands of homes and affected the livelihood of the population. A total of five villages are located in Bantul, namely Parangtritis, Tirtohargo, Srigading, Gadingsari, and Poncosari, which are located by the coastline and face the potential threat of both earthquake and tsunami (Daryono, 2020).

1 RedR Indonesia
2 Urban Culture Research Center, Osaka Metropolitan University
3 *Babad in Sangkakala* is a Javanese manuscript presented in prose and discusses history of Java in the mid-18th century.

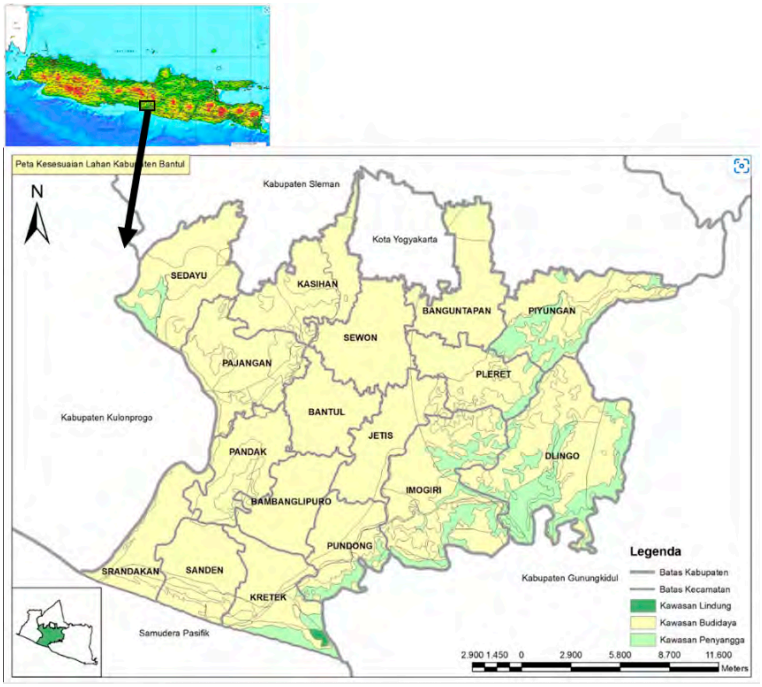

Figure 1 Map of Bantul District in the Island of Java (Source: 5tudiomagnificent5.blogspot.com)

OBJECTIVES

This research aims to understand ICHs in Bantul related to disaster risk reduction (DRR) and to clarify such relationship. This research is focused on selected ICHs that are clearly related to disaster. This research intends to determine the following: 1) associated risks of the selected ICHs in Bantul, 2) the relationship of ICHs to DRR, and 3) the effectiveness of ICHs for DRR purposes.

METHODOLOGY

The research was conducted in Bantul District from November 2022 to February 2023. Qualitative research methodologies based on literature reviews, data collection, interviews, and focus group discussions (FGD) were applied (Creswell, 2014; Sugiyono, 2010). Based on questions such as 'What are the risks of ICH in Bantul?' 'What is the relationship between ICH and DRR?' and 'How effective is ICH for DRR activities?', the collected data and information were analysed and interpreted via a descriptive analysis technique to identify the aspects related to ICH and DRR.

Based on literature reviews, the research team selected three ICH elements: *labuhan* (a traditional ritual ceremony), *joglo* (vernacular traditional Javanese architecture), and *ketoprak* (a local theatre). The selection of these three ICH elements considered their relationship with the DRR. The team conducted interviews with seven ICH practitioners and five individuals in the community and FGD involving six ICHs and six DM practitioners.

In addition to the existing literature, the information used was limited to the selected resource persons of the interviewees and participants in the FGDs and as such, the findings are subjective. As initial findings, the results of this research are open for further study for the purpose of strengthening community disaster preparedness measures and revitalizing ICHs in Bantul.

INTANGIBLE CULTURAL HERITAGE (ICH)

Labuhan in Bantul

Labuhan in Javanese means to wash out offerings. *Labuhan* originates from the story of the first Sultan of the Mataram Kingdom in Yogyakarta, Panembahan Senopati, who united with the mythological figure of *Ratu Kidul* or Queen of the South Sea/Indian Ocean in the 16th century (Reid, 2012; Soelarto, 1980). The union resulted in protection for the King, the kingdom, and the people.

According to the Ministry of Education and Culture (2018), *labuhan* is conducted to pay respect to the founders of Mataram Sultanate on every 30th of Rajab in the Javanese calendar. There are two types of *labuhan* still practiced. *Labuhan Alit* is an annual ceremony for the celebration of the Sultan's birthday, and *Labuhan Ageng* is held every eight years. *Labuhan* is held at Parangkusumo Beach in Bantul, Merapi Volcano in Sleman, Dlepih Kahyangan in Wonogiri, and the summits of Lawu Mountain in Sragen. A ritual ceremony begins at the Sultan Palace and then proceeds to four locations: Parangkusumo beach, Merapi volcano, Dlepih, and Lawu mountain.

The offerings used in *labuhan* consist of the Sultan's personals items (nails, hair, and used clothes), umbrella, flowers, food, and fruits, each of which implies a particular significance (Soelarto, 1980). At the end of the ceremony, the offering is washed out to sea and immediately grabbed by the attending people who believe that the items provide good luck. The ceremony is believed to bring peace, safety, and prosperity; if neglected, it may cause calamities. The Sultanate continues to exercise *labuhan* annually.

Associated risk of labuhan

Labuhan reflects a social function in people's lives that becomes hereditary for those living in Yogyakarta. Usman (2023) states that the majority of the local people

Figure 2
Labuhan Ceremony in Parangkusumo Beach in Bantul (Source: TribunJogja.Com/Santo Ari)

continue to believe that *labuhan* is a means to express gratitude and request the Almighty for safety from all kinds of calamity, which include earthquakes and tsunamis. New inhabitants on the southern coast of Bantul who have no familiarity with the ceremony and monotheists may not exhibit such a belief or perception.

As an ICH element, *labuhan* is a ritual tradition that does not face a direct threat from any disaster, but a possible disruption from vandalism by individuals or groups. Therefore, *labuhan* is at less risk of fading away.

Relation to DRR

Yulianto's (2018) recent geo-mythological study explains that tsunami occurred around 400 years ago, a time that presumably coincides with the founding of the Mataram Sultanate. The presence of *Ratu Kidul* may be associated with a metaphor of large waves.

Suraji (2023) assumes that people nowadays cannot relate *labuhan* and *Ratu Kidul* directly to any tsunami event. The perception is confirmed by the fact that there is neither publicly available record nor witnesses in the community from any generation to refer to. Nevertheless, the wish expressed during *labuhan* ceremony is to be free from any calamity, including the threat of tsunami.

Effectiveness

Since the development of the National Tsunami Early Warning System (InaTEWS), science and technology have been employed as the basis for the development of the knowledge and monitoring, decision-making, dissemination of warnings, and community response (UNISDR, 2006). Ayyub confirms that warning dissemination technology connects the local warning operation centre at the Local Disaster Management Office to the sirens installed in the communities. In the Bantul District, this local warning system is tested regularly on the 26th of every month to ensure its function. The Local Disaster Management Office and the National Agency for Disaster Management implemented the Disaster Resilient Village programme. This programme develops village level's risk analysis, actions plan, early warning system, evacuation plan, contingency plan, and DRR village forum. Communities show willingness to receive products of the InaTEWS and use them to strengthen village disaster preparedness measures.

The annual *labuhan* ceremony and the mythology of *Ratu Kidul* may constitute reminders and opportunities to promote DRR towards reoccurrence of earthquakes and tsunami. Discussions with DRM practitioners reveal that there is a lack of systematic approach to utilising mythology for DRR purposes. Local wisdom has been discussed in different forums, but its implementation remains minimal. This opinion is also relevant to the National Agency for Disaster Management, which on different occasions encourages the employment of local wisdom or ICHs to complement science and technology for socialisation in communities. Relevant mythology can be embedded in disaster preparedness activities in a package that is appropriate for the local culture to gain acceptance. Efforts are needed to find effective ways to utilise mythology for different purposes in DRR activities.

Joglo

Joglo is a traditional Javanese wooden house commonly found in the Special Region of Yogyakarta, Central Java, East Java, and Bali provinces, and has the tectonic character of vernacular architecture of craftsmanship transmitted through generations (Gunawan et al., 2017). *Joglo* are characterised by a pyramidal roof shape (*tajug*) which inhibits hot air from flowing down to the functioning rooms underneath and is thus responsive to the tropical climate (Alvin et al., 2019). The roof is supported by four main pillars (*saka guru*), surmounted by a structural element of two main beams (*sunduk* and *kili*) and a high multibeam frame (*tumpang sari*) (Tjahjono, 1999). The heavy weight of the roof stabilises the pillars (Prihatmaji, 2007), each of which is placed on a stone or wooden pedestal (*umpak*) to function as a foundation to bear the heavy structure (Mainah, 2017). During an earthquake, the four wooden pillars of *joglo* function as the core structure to withstand the lateral forces (Prihatmaji, 2007). Each connected joint uses a mortise and tenon (*purus*) system to lock the joints of the pillars and beams, which allows the joints to adjust flexibly. The overall system allows *joglo* to be of a knockdown construction.

Joglo is usually made from teak wood, which is known to be strong, durable, but costly, and is associated with the traditional dwellings of Javanese noble or wealthy families, either in urban or rural areas; thus, *joglo* indicate high social status (Kustianingrum, 2009). A total of 12 variant shapes of *joglo* exist (Gunawan et al., 2017) and each has artistic and old-fashioned elements. *Joglo* are commonly used for family houses, pavilions, or halls. People generally adopt *joglo* structure for houses, made of teak or other lower quality of wood (jack fruit, palisander). The three main components of *joglo* as a house consist of *pendapa* in the centre used as a living room, *dalem ageng* at the rear for family rooms, and *pringgitan* as corridor connecting the *pendapa* and *dalem ageng. Gebyok* of assembled wooden panels is used for the walls and room separators.

Associated risk

Having a reputation as a safe structure, many old *joglos* survived the devastating earthquake in Bantul in 2006 (Mainah, 2017) and some past occurrences. The interviewees admitted that *joglo* is a strong and traditionally artistic structure, yet it is costly to construct and maintain (Dakung, 1998; Dharmasanti, 2020). Constructing *joglo* requires considerable land space, which is currently a challenge for many families. Many families tend to adopt contemporary designs of cemented houses for

Figure 3

The Structure of *Joglo*
(Source: https://www.mebelamara.com/2016/04/struktur-joglo.htm)

Figure 4
A *Joglo* for Dwelling
(Source: https://courtina.id/)

practical reasons, less costly and easy maintenance, flexible room divisions, and adjustable designs against available land space.

Aside from using *joglo* for houses, people build new *joglos* or reuse old *joglos* to function for different public purposes: offices, pavilions, galleries, restaurants, or performance halls. New and reused *joglos* maintain the principles of the structure, with some modifications of cemented walls instead of wooden panels. *Joglo* continue to be adopted given its reputation as a safe structure and for preserving traditional artistic values.

Relation to DRR

According to Mainah (2017), two resistant earthquake systems of *joglo*: 1) the joints between the beams, the pillars, and the pedestal move flexibly, and 2) the weight of the roof on the pillars stabilises in response to earthquake tremors. Alvin (2019) suggested the adaptation of the knockdown design of *joglo* architecture and found that it meets the Sphere Minimum Standard criteria related to the effectiveness (expandability, responsive to local custom and climate) and the efficiency (knockdown, expandability, aftershock resistant) to be applied in constructing temporary shelters.

Interviewees estimate over 50% of *joglo* survived the earthquake in 2006. The main structure of *joglo* remains standing, and the damaged parts are due to the unstable ground.

Effectiveness

The number of *joglo* erected in Bantul increased for different functions. The originality of some *joglo* is maintained, while others have undergone modification. Pamela (2023) observes that after the 2006 earthquake, a shift was observed in the use of *joglo* structures in Bantul from a family house to public purposes (café, hotels). Modification or simplification of parts of the architecture design is done not only to fit in the land area and to minimise the building cost but to keep the main structure (roof, pillars, pedestals). The joint system technique in *joglo* is also useful for other woodworking jobs.

Figure 5 Process of Constructing *Joglo* (Source: Alvin 2019)

Sriyono (2023) states that woodworkers require technical knowledge and skills of the *joglo* system for an earthquake-safe building construction and in furniture making. Socialisations of Javanese architecture guidelines were held after the 2006 earthquake for rehabilitation and reconstruction work. The events improved the knowledge and interests of the people regarding Javanese construction, including *joglo.* Further similar informal technical knowledge dissemination is still needed for young woodworkers. People's interest in Javanese architecture using low-cost wood shall be encouraged.

Ketoprak

The word *ketoprak* is onomatopoeic and is derived from the sound *kethok* and *prak* of beating a *lesung* (rice pounder), the main instruments used during traditional plays and performances. *Ketoprak* was a travelling commercial theatre. However, with the advent of many other forms of entertainment, the commercial theatre format has become obsolete and is now often performed by local people for their own entertainment and some arecommercial in town.

Nurseto (2023) states that *ketoprak* is performed for between two and three hours by a group of local artists displaying talent and skills with improvisation and spontaneity on stage. A group of *ketoprak* usually has a director, script writer, crew, and cast of no less than 15 persons; in a festival, it involves approximately 50 people. *Ketoprak* is characterised by the artistic components of storytelling, singing poems, the repertoire of *gamelan,* traditional outfits, manners, and stage setting. The themes of *ketoprak* often adopt stories based on old kingdom themes or daily life performed in a classic Javanese fashion. *Ketoprak* may also be formed spontaneously by talented members in villages for the purpose of celebrating public events, and the stories chosen vary from old themes with improvised contents and emphasising specific important messages for the public.

Associated risk

As *ketoprak* performances tell Javanese classic stories, they usually attract older audiences and a few younger people. Repeated stories and monotonous performances add to the gradual decrease in audience size over time. According to Nurseto (2023), this has caused the frequency of *ketoprak* performance to decrease since 2000, and consequently led actors to leave their groups. As such, *ketoprak* faces risk to fade.

Figure 6
Ketoprak performed by FKKB on the 20th of May 2023
(Source: Benny Usdianto)

Figure 7
Ketoprak festival in Yogyakarta
(Source: SKTV net Official)

Regeneration is considered one of the most important processes in a *ketoprak* group (Diani, 2020). Problems in regeneration were also strongly discussed among ICH practitioners during FGD. *Ketoprak* groups discontinue as they are unable to attract the interests of young people and are not sufficiently responsive in terms of new form and creativity.

According to conservators, the documentation of *ketoprak* preserves values which are important for study and development. Lieke (2023) states that ICHs are often preserved inflexibly, which inhibits the development of ICHs. Knowledge about different media and digitalisation for documentation is necessary to allow development and adaptation for continuous preservation.

Case Study: Communication Forum of Ketoprak in Bantul District

Established in 2004, the Communication Forum of Ketoprak in the Bantul District (FKKB)[4] is a forum with 17 members of smaller *ketoprak* groups from all the 17 sub-districts in Bantul. FKKB was formed to continue the *Wahyu Manunggal* Group, which has been popular since its establishment in Bantul in 1989. The group experienced difficulties in replacing actors and members and was later abandoned. Other *ketoprak* groups experience similar difficulties in terms of regeneration.

The FKKB is intended to become a venue for dialogue among *ketoprak* actors for the sustainability of *ketoprak*; new initiatives by its members to make *ketoprak* more

4 *Forum Komunikasi Ketoprak* Bantul

attractive are accommodated. FKKB also serves as an open space for the public to learn about arts performance. The forum envisages the regeneration of *ketoprak* actors by conducting open recruitment to reach up to 70% of people under the age of 40 to participate. Recruiting the young are viewed to endure their participations in performances for longer period.

Nurseto (2023) states that *ketoprak* is not simply a performance but is instrumental in communicating ethical messages or good practices to the public. A specific message is formulated and presented in the dialogue. For example, when performing the story of *Cendani,* FKKB wrote a script concerning an outbreak of plague in a village that caused conflict in the community until a local hero appeared and found a solution. The performance won the award for the best script in a *Ketoprak* Festival sponsored by the Special Region of Yogyakarta in 2022.

Relation to DRR

The practitioners claim that, while *ketoprak* is not directly related to DRR, it has been utilised in post-disaster phases for entertainment purposes or psychosocial healing activities for the survivors: for example, during the post-earthquake in Bantul in 2006, and the Merapi volcano eruption in 2010. In commemoration of the Bantul earthquakes in 2021, 2022, and 2023, *ketoprak* was also used to tell stories related to disaster management; the players included government officials of the Bantul District.

Effectiveness

The presence of many *ketoprak* groups in Bantul has the advantage of reaching broad communities. As a useful medium, *ketoprak* creates opportunities to communicate knowledge and policies related to DRM to the public in between dialogues. Actors sufficient understanding of specific issues in disaster management and ability to simplify the language to suit the audience is important.

Disaster practitioners observed that, in many cases, the actors of *ketoprak* inserted insensitive jokes relating to gender and inclusion issues. This indicates that strengthening actors' knowledge should be comprehensive and cover disaster management issues (risk analysis, prevention, mitigation, preparedness, response, and recovery) and codes of conduct. Not all *ketoprak* actors have the capability to comprehend disaster management. In this case, disaster management practitioners' accompaniment of *ketoprak* actors may be considered. In Bantul, where many villages have a DRR Forum, the members may also be involved in the performance to specifically present messages related to DRR. Both ICH and DRM practitioners admit that communication between them is still minimal and should be improved for the purpose of DRR knowledge dissemination.

Good digital documentation of *ketoprak* for dissemination using various social media is effective for public education purposes. Social media store audio-visual documentation that is easily accessible by the community at large. Discussion with the FKKB revealed that such documentation requires funding that is normally beyond the financial capacity of most *ketoprak* groups. Therefore, external support is necessary to facilitate production of digital documentation.

Figure 8
A set of *gamelan* musical Instruments
(Source: Travelingmagz.com)

Development of ICHs

According to Pardiman (2023), modernisation in the community requires adjustments in practising ICHs. Aside from sustaining ICHs, the adjustment aims to achieve the intended purposes, for example, education, nurturing compassion, and tolerance. Omah Cangkem, a play studio for children in Bantul, uses *gamelan* as a medium to educate children about solidarity and cooperation in a playful atmosphere.

Traditional *gamelan* music is essential to Javanese performing arts. In the aftermath of past disasters, Indonesia's mutual aid system, known as *gotong royong*, has attracted considerable attention during the emergency response and early recovery phases. The relationship between this system and *gamelan* music is also noted. In an interview[5], Pardiman, an organiser of traditional arts classes for children at '*Omah Cangkem*', pointed out the following regarding the relationship between *gotong royong* and *gamelan* music:

- *Gotong royong* custom gained considerable attention from around the world in 2006 after the large earthquake hit Bantul and its surrounding area. It is true that it is a deeply ingrained Javanese tradition. However, it is not simply about immediate assistance in the face of every disaster. What allows us to help each other so readily is the collaborative spirit and mutual respect nurtured through our traditional performing arts of acapella by children. In essence, these arts serve as a mechanism for fostering *gotong royong*.
- The musical structure of *gamelan* is that one simple melody is enhanced by many instruments. The melody played by each player is very simple, but when the sounds of all the instruments overlap, the music becomes very complex. Every player has an equal role in playing music; there is no solo player as in Western music, and each of the approximately 30 instruments are played without standing out.
- Additionally, unlike Western classical music, *gamelan* does not have a conductor. The drum player becomes the leader and uses the sound of the drum to give instructions such as the tempo and atmosphere of the music and how many times to repeat the melody. Therefore, all the other players must listen carefully to the sound of the drum. In this way, *gamelan* music is

5 Mr. Pardiman was interviewed by Okabe Masami and Laras Aridhini at *Omah Cangkem* Studio in January 2023.

characterised by all the players working together to create a single piece of music and create harmony. This characteristic of everyone working together to create a single piece of music with no one standing out fosters the custom of *gotong royong*, which is a spirit of mutual aid.

DISCUSSION AND CONCLUSION

The interviews and FGDs involving the ICH and DRR practitioners revealed the following four viewpoints.

1) ICH Endurance

Labuhan, omah joglo, and *ketoprak* have withstood various challenges over time and continue to endure today in Bantul. The *labuhan* ceremony continues to be practiced annually and maintains the same purpose of requesting safety from any potential calamity in the local community. The traditional *omah joglo* can be found in both rural and urban communities. Newer *joglos* are built by maintaining their original structure or combining their core structure with current building designs and materials. *Joglo* are used for dwelling and different public functions. Today, *ketoprak* is still performed voluntarily in villages and professionally in urban areas regardless of continuous modernisation. This performing art is particular as it is adaptable for modification to suit changes in the community.

2) Delivery of DRR message

The geomythology of *labuhan* reveals the relationship between the people and their immediate living environment; it may be paired with the scientific research findings on paleotsunami. The combination of local wisdom and scientific information is useful for public education. Technical information on the traditional architecture of *joglo* is helpful for architects and civil engineering engineers in designing safe building structures.

3) Collaboration of ICH and DRR Practitioners

A good understanding of ICHs by DRR practitioners is necessary because it complements the scientific information commonly used in DRM activities. This combined information is useful for targeting different elements of the community for public education. The utilisation of ICHs for DRR purposes, in turn, contributes to ensure the longevity of ICHs. ICH practitioners otherwise benefit from a better understanding of DRR for their respective interests. Thus, collaboration between ICH and DRR practitioners is important to reciprocally broaden insights.

4) Communal spirit

One of the contributing factors that enables ICHs to withstand the changing era is the mutual aid system in the Bantul community. Under the guidance of the Sultanate of Yogyakarta, the inner circle of the Sultanate and the enthusiasts participate willingly in *labuhan* ceremony. The construction of *joglo* in rural areas voluntarily involves neighbours and relatives. Much of the organisation and performance of *ketoprak* are carried out independently by the cast and crew, which often includes the provision of costumes, stage setting, transportation, and consumption. Thus, the existing spirit of mutual aid or *gotong royong* eases the implementation of ICHs in Bantul.

REFERENCES

Aldiansyah, S. (2021). Disaster Mitigation through Local Wisdom, Universitas Indonesia [University of Indonesia]. ResearchGate. https://pmb.lipi.go.id/mitigasi-bencana-melalui-kearifan-lokal/

Alvin, T., and Gunawan, Y., (2019). Architecture Development for Post Earthquake Temporary Shelter. *Journal RISA (Riset Arsitektur),* 3(3), 205-221.

A Suciani, et al. (2018). The Open access IOP Conference Series: Earth and Environment Science. 148 012005

Creswell, J.W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 4th Edition. Los Angeles, USA: Sage.

Dakung, S. (1998). Traditional Architecture of the Special Region of Yogyakarta. Jakarta, Indonesia: CV. Pialamas Permai.

Daryono. (2020). *BMKG,* 20-Meter Tsunami Potential in the Southern Coast of Java Island, CNN Indonesia [Video]. YouTube. https://www.youtube.com/watch?v=j5-ytH8FSpQ

Dharmasanti, R. and Dewi, S. P. (2020). The Open access IOP Conference Series: Earth and Environment and Science. 409 012025

Diani, Y. (2020). Regeneration Crisis of the Art Group of Ketoprak in Pati. Jurusan Sosiologi dan Antropologi Fakultas Ilmu Sosial Universitas Negeri [Department of Sociology and Anthropology, Faculty of Social Sciences, State University], Semarang, Indonesia. https://lib.unnes.ac.id/46699/1/SKRIPSI_YESIKA%20DIANI_3401416024%20-%20Yesika%20Diani.pdf

Gunawan, Y., Enggarsari, W., and Putra, W. R. (2017). Research Report of Joglo Architecture Tectonic. Bandung, Indonesia: Research Institutions and Community Services, Universitas Katolik Parahyangan [Parahyangan Catholic University].

Ministry of Education and Culture. (2018). The Directorate of Heritage and Culture Diplomacy, Intangible Cultural Heritage Catalogue of Indonesia (Book 1). Jakarta, Indonesia.

Khoirul, A. (2017). The Existence of New Style of *Ketoprak Siswo Budoyo* in Tulungagung in 1958-2002, *e-History Education Journal*, 5(2), July 2017, Avatara.

Kustianingrum, W. (2009). The Use of Javanese Traditional Architecture for Restaurant. Depok, Indonesia: Faculty of Technic, Study Programme of Architecture, the University of Indonesia.

Local Disaster Management Office. (2021a). Summary of Implementation Report of the District Government of Bantul. Bantul, Indonesia: Local Disaster Management Office. https://setda.bantulkab.go.id/storage/setda/menu/22/RLPPD_BANTUL-2021.pdf

Local Disaster Management Office. (2021b). The Special region of Yogyakarta, Data and Information of Disaster in Indonesia. Yogyakarta, Indonesia. http://bpbd.jogjaprov.go.id/assets/public/DIBI%202021_BPBD%20DIY_min.pdf

Mainah, D. M. (2017). The Philosophy and the Influence of the Construction of the House Joglo against Earthquake in Jagalan Village, Banguntapan Sub District, Bantul District. Yogyakarta, Indonesia: Social Studies Education, Yogyakarta State University.

National Agency of Disaster Management. (n.d.). https://katalogkesiapsiagaan.bnpb.go.id/penilaian-ketangguhan-desa/#data-pkd

Population and Civil Registration Office of Bantul District. (2022). Profile of Population of Bantul District. Bantul, Indonesia: Population and Civil Registration Office of Bantul District. https://disdukcapil.bantulkab.go.id/

Prihatmaji, Y. P. (2007). The Behaviour of Javanese Traditional House "Joglo" towards Earthquake, *Dimensi. Journal of Architecture and Built Environment*, 35(1), (7)

Reid, A. (2012). Historical Evidence for Major Tsunamis in the Java Subduction Zone. *Asia Research Institute, Working Paper Series*, No 178.

Tjahjono, G. (Ed). (1999). *Indonesian Heritage* (Volume Architecture). Heritage Court: Archipelago Press.

Saptomo, S. (1996). The History and Development of *Ketoprak* in the Life of Modern Community. *Jurnal Cakrawala Pendidikan* [*Journal of Educational Horizons*], No 2, Year XV, June 1996. https://journal.uny.ac.id/index.php/cp/article/view/9227

Setyawan, B. W., Saddhono, K., and Rokhmawati, A. (2017). Sociological Aspects and Local Specificity in the Classical Ketoprak Script of Surakarta Style. *Journal of Language and Literature*, 17(2), October 2017.

Soelarto, B. (1980). *Labuhan* Ceremony of Yogyakarta Sultanate. Jakarta, Indonesia: Jakarta Culture Media Project, the General Directorate of Culture, the Department of Education and Culture.

Sugiyono. (2010). Quantitative, Qualitative and R&D Research Method. Bandung, Indonesia: Alfabeta.

United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UNISDR). (2006). Global Survey of Early Warning Systems.

Yudhicara, Y., Zaim, Y., Rizal, Y., Aswan, A., Triyono, R., Setiyono, U., and Hartanto, D. (2013). Characteristics of Paleotsunami Sediments: A Case Study in Cilacap and Pangandaran Coastal Areas. *Indonesian Journal of Geology*, 8(4), December 2013: 163- 175, Jawa.

Yulianto, E. (2018). *The Untold Story Java Southern Sea*. BRIN Indonesia [Video]. YouTube. https://youtu.be/HZsqYZ9Ve1E?si=d9ebDPZJhBqUb9wB