

DOI: 10.5281/zenodo.11425228

# THE CULTURE OF THE CANGKRINGAN COMMUNITY IN UNDERSTANDING THE SIGNS OF MOUNT MERAPI ERUPTION DISASTERS

Septian Aji Permana<sup>1\*</sup>, Mohamad Maulana<sup>2</sup>, Ferani Mulianingsih<sup>3</sup>

<sup>1</sup>Universitas PGRI Yogyakarta, Indonesia, aji@upy.ac.id. <https://orcid.org/0000-0002-7087-2424>

<sup>2</sup>University Putra Malaysia, Malaysia.

<sup>3</sup>Universitas Negeri Semarang, Indonesia.

Received: 10/10/2025

Accepted: 10/11/2025

Corresponding Author: Septian Aji Permana  
([aji@upy.ac.id](mailto:aji@upy.ac.id))

## ABSTRACT

*Disasters cannot be prevented, but the number of victims can be minimized by recognizing the signs of an impending disaster. This study aims to describe the various kinds of knowledge about the signs of the Merapi eruption derived from community wisdom and to scientifically examine people's understanding of these signs. This research uses a qualitative approach to study the local wisdom of the Cangkringan community as an effort to detect signs of a potential Merapi disaster. The results were then analyzed scientifically in collaboration with disaster experts from both academic and practical fields. The informants were members of the Cangkringan community living in areas prone to Merapi eruptions. Data were collected through observations and interviews, then analyzed using a descriptive analytical model and verified by disaster experts. The findings indicate that, based on their experiences, the informants had encountered various disasters in Cangkringan, such as lava flows, pyroclastic clouds (wedhus gembel), and cold lahars. The Community's traditional knowledge about the signs of Merapi eruptions sometimes aligns with scientific studies by academics and practitioners, but in some cases, it does not. The wisdom possessed by the Cangkringan people originates from their own community and has been passed down from generation to generation. They have attempted to pass on this knowledge orally to their descendants, thereby increasing awareness and preparedness to act independently and spontaneously (leadership). This local wisdom plays a vital role in developing disaster-resilient communities.*

---

**KEYWORDS:** Community Wisdom, Culture, Eruption Disaster, Preparedness.

---

## 1. INTRODUCTION

Based on Law No. 24 of 2007, disaster management activities are not only the responsibility of the government but also require the involvement and participation of the community, schools, universities, businesses, as well as local and international Non-Governmental Organizations (NGOs). Each related stakeholder is required to play an active role in disaster management activities. These activities can be carried out in various ways, including spatial planning, housing relocation, development policies, and the use of community wisdom for preparedness in facing disasters.

The occurrence of disasters cannot be prevented; however, the number of casualties can be minimized if residents have early preparedness for natural disasters (Fatiyah and Harahap, 2007). One way to minimize the impact of disasters is by utilizing community wisdom in understanding the signs before a disaster occurs. Community wisdom refers to the ways and practices developed by a group of people, originating from a deep understanding of the local environment, which has been formed and passed down from generation to generation. There are several important characteristics that come from this local wisdom: it originates from within the community itself, is disseminated informally or non-formally, is collectively owned by the community, is passed on to future generations and easily adapted, and is deeply rooted in the community's way of life as a means of survival.

The benefits of community wisdom in reducing disaster risk were proven during the earthquake and tsunami in the Indian Ocean at the end of December 2004. The disaster devastated coastal areas and claimed more than 150,000 lives. However, such a massive disaster caused only a minimal number of victims on Simeulue Island, which was the nearest land to the epicenter of the earthquake. Meanwhile, in regions located farther away, tens of thousands of lives were lost (Kolibri, 2012). The low number of victims was due to the belief held by the residents of Simeulue Island that when there is a sea wave or "smong" indicated by seawater that suddenly recedes without any influence of weather or climate, they must immediately move away from the beach and go to higher ground. This phenomenon has long been believed by the people of Simeulue Island and has saved them from the tsunami disaster in 2004.

From the perspective of cultural wisdom, natural behaviors—including those of animals and plants—are understood by traditional communities as natural phenomena that can serve as indicators of impending natural disasters. Long-standing stories and natural

events become sources of inspiration and subsequently elicit responses in the form of behaviors to cope with nature's turbulence. These stories are then passed down from generation to generation as knowledge for understanding and responding to nature and its changes.

This research is considered quite important, given Indonesia's high disaster vulnerability, including in the Special Region of Yogyakarta (DIY), which requires national resilience strategies to address the potential threat of Mount Merapi eruptions. Cangkringan, as an area prone to disasters, certainly possesses its own local wisdom in detecting the signs of an impending Merapi eruption. However, this local wisdom remains only as general community knowledge and has not been fully identified. In fact, various practices and specific strategies contained in this local wisdom have proven to be highly valuable in facing natural disasters and can even be transferred and adapted by other communities facing similar situations.

One of the groups considered to play a significant role in preserving and transmitting knowledge derived from this local wisdom across generations is the community itself. Efforts to identify various forms of community wisdom in recognizing the signs of Merapi eruption disasters require the participation of community members as key informants. In reality, although in several aspects the role of the community has declined, they still play an important role in various aspects of social life, particularly in the field of culture. Several research findings regarding the role of the community include a study conducted by Suharti (2008), which concluded that the community plays a role in cultural preservation by instilling values in their descendants related to moral conduct and manners.

Research by Swasono (1978) found that the community contributes to cultural preservation by maintaining traditions and strengthening kinship ties through family lineages. The findings of Suwarjo (2009) revealed that both rural and urban communities play a role in preserving the environment according to their respective conditions. Furthermore, Hiryanto's (2013) research concluded that the local wisdom possessed by the elderly enables them to detect signs of earthquake disasters occurring in the Special Region of Yogyakarta (DIY). The findings of these studies prove that the community still plays a role in cultural preservation, including in maintaining various types of knowledge derived from community wisdom, such as knowledge related to facing natural disasters. The local wisdom about the signs of disasters

possessed by the community needs to be identified so that it can be scientifically justified and applied as one of the community preparedness concepts in facing disasters.

## 2. LITERATURE REVIEW

The issue of preparedness in facing disasters involves various dimensions of life, both at the individual and community levels. Therefore, the problem of disaster preparedness requires a comprehensive approach, particularly in building public awareness to become more ready to respond independently and spontaneously.

The community needs to be made aware of the importance of being more alert to disasters. The lower or weaker the level of public awareness of vulnerability, the higher the number of casualties will be (Illrich, 1994). Conversely, the higher the level of community awareness of disasters, the lower the number of casualties. Therefore, people must be made aware to always be prepared for disasters.

Preparedness is an effort carried out to anticipate the possibility of a disaster in order to prevent the loss of life, property, and disruption of social order. Preparedness activities can be explained in such a way that they are easier for the community to understand (Law No. 24 of 2007 concerning Disaster Management).

The community's view of preparedness efforts in facing disasters is largely understood as an event, rather than a process that aligns with the local community's conditions (Fritz, 1994). This has resulted in the diversity of disaster management activities developed by stakeholders not always aligning with what the community expects.

### 2.1. Cultural Value Orientation

According to Kluckhohn (1961), culture is acquired knowledge used by people to interpret experiences and guide behavior. Based on this theory, there are at least four aspects that hold the highest value in every human culture, namely:

1. a) human nature, or the meaning of human life;
2. b) man-nature, or the meaning of the relationship between humans and their surrounding environment;
3. c) nature perception, which refers to human perceptions of nature; and
4. d) relation, which refers to relationships among human beings.

Based on the theory of cultural value orientation mentioned above, the cultural value orientations of the Cangkringan community can be described as follows:

1. In relation to the meaning of human life, culture teaches the community to always eling lan waspodo (to remember and be aware), meaning to obey local customs and avoid any prohibitions.
2. Regarding the relationship between humans and nature, culture views nature as powerful and perfect, so humans should submit to nature without destroying it (subjugation to nature). Culture teaches people from an early age that although nature can be fierce, human reasoning must be able to uncover its mysteries to adapt and overcome its challenges. Humans must be able to live in harmony with nature (harmony with nature).
3. In relation to human perception of nature, culture should provide a perception that can be trusted as a form of preparedness in facing the threat of natural disasters.
4. Concerning relationships among human beings, culture teaches the values of mutual cooperation (collaterality) and respect for the behaviors of nature around them.

These four aspects are what Kluckhohn referred to as value orientation, or cultural value orientation. Therefore, to conduct cultural studies, researchers must analyze the traditions of the local community, as well as their perceptions, attitudes, and social actions.

### 2.2. Symbolic Interaction

According to Mead (1931), community behavior carries meanings behind what appears externally during social interaction. Therefore, deep observation and interviews are needed to uncover the hidden behaviors.

For Cooley (1929), the meaning of social life in society must be found through social interactions. Society builds its environment and its world, all of which are formed based on sympathy with the highest form being love for fellow creatures of God and love for God Himself.

Mead (1931) emphasized that society is a holistic and evolving process inseparable, non-linear, and unpredictable. Community behavior operates based on phenomenological interpretation, meaning it occurs through intention, meaning-making, and purpose, rather than through mechanical or automatic processes. Thus, social behavior is purposeful and not deterministic.

The mental concept of society is dialectical, acknowledging the existence of thesis, antithesis, and synthesis. It is idealistic rather than materialistic. The

symbolic interaction built between the Cangkringan community and Mount Merapi is reflected in the Labuhan ceremony tradition, which serves as an expression of gratitude from the people of Cangkringan to Mount Merapi for providing them with life. This demonstrates a reciprocal relationship between the Cangkringan community and Mount Merapi.

The interaction does not stop here. The people of Cangkringan need to understand the philosophical meaning hidden behind the messages or advice conveyed by Mount Merapi. Although Mount Merapi brings blessings, it can also pose a threat at any time; therefore, the people of Cangkringan must always remain vigilant. This advice serves as a symbolic message from Mount Merapi to the people of Cangkringan to always be eling lan waspodo (to remember and stay alert).

### 3. METHODOLOGY

This study uses a qualitative approach to explore in depth the knowledge of local wisdom related to the community's role in detecting the signs of Mount Merapi eruptions. The results were then scientifically analyzed together with disaster preparedness experts from both academic and practical backgrounds. The research was conducted in the Special Region of Yogyakarta, specifically in Cangkringan District. Cangkringan was chosen as the research site because, geographically, it has a high level of vulnerability to Merapi eruptions, although the community perceives these eruptions as a blessing.

The subjects of this research were members of the Cangkringan community who were believed to possess knowledge and understanding of the signs of Merapi eruptions based on local wisdom. The selection of informants used the snowball sampling technique by considering the following characteristics: (1) men or women aged 50 years and above; (2) possessing knowledge of local wisdom related to identifying signs of Merapi eruptions;

(3) applying this knowledge in recognizing eruption signs; and (4) being able to provide the necessary information. Although the research used a sampling technique, the findings are expected to be applicable to other locations with similar conditions and cultural contexts. Based on these criteria and guidance from key informants in the area, 14 informants were selected, consisting of 12 people from Pelemsari Village and 2 people from Umbulharjo Village.

The data obtained were analyzed using qualitative analysis followed by descriptive analysis.

In qualitative research, data analysis is essentially the process of organizing and reducing data into patterns, categories, and basic units of description to identify themes and formulate conclusions. The analysis was carried out both during and after the data collection process. The analytical work involved organizing, sorting, coding, and categorizing the data to produce descriptions that align with the research aspects being studied.

## 4. RESULTS

The research informants were diverse. Based on gender, there were 9 men and 5 women. In terms of occupation, they came from various professions, including royal servants (abdidalem, 2 people), civil servant teachers (3 people), farmers (2 people), livestock breeders (3 people), subdistrict civil servants (1 person), forestry civil servants (1 person), and traders (2 people). The informants' ages ranged from 40 to 70 years, with an average of 55 years. This indicates that the informants generally represented a community with diverse occupations and educational backgrounds.

In terms of behavior related to utilizing local wisdom to understand the signs of Merapi eruptions, all members of the community tended to apply their local wisdom in responding to disasters. Regarding education, most informants had formal education. The majority attended Madrasah Ibtidaiyah (7 people), university (5 people), while 2 others had never attended school because they served as royal servants (abdidalem) at the Yogyakarta Palace.

### 4.1. Community Experiences Related To Disasters

Field findings in Pelemsari, Umbulharjo Village, Cangkringan District, showed that all six informants shared their personal experiences related to the eruption of Mount Merapi that occurred on Thursday night, November 10, 2010. The informants explained that the eruption of Mount Merapi was marked by a loud rumbling sound (greg-greg or gludug-gludug), shaking ground, and hot clouds flowing through the Gendol River. According to Mr. BR (70 years old), before the eruption, there were several warning signs, such as the appearance of many wild animals (tigers and monkeys) descending from the mountain and an increase in air temperature. Other informants, namely Mrs. KT (62 years old), Mr. AG (64 years old), and Mr. PJ (65 years old), stated that before the eruption that caused the death of the juru kunci (spiritual guardian) of Mount Merapi, Mr. Marijan, there were noticeable differences in the signs compared to the 2004

eruption. The 2010 eruption was marked by terrifying and continuous rumbling sounds (gludug-gludug) that did not stop, unlike previous events.

Other disaster experiences that were shared by the informants included the eruption of Mount Kelud, as told by Mr. DD (58 years old), Mr. HR (55 years old), Mrs. JM (50 years old), Mr. D (45 years old), and Mr. AJ (72 years old). At that time, according to Mr. SL (65 years old), around 3:00 p.m., all residents shouted, "Earthquake... earthquake!" During that moment, Mr. SL held on tightly to a tree. He recalled that the situation was marked by heavy ash rain, darkness, and heavy rainfall. Mr. IM (59 years old) shared his experience of the eruption of Mount Krakatau. At that time, he said that the land in West Java collapsed the world seemed to disappear (sink into the ground).

The community actually possesses what is known as the "Merapi Promise" (Janji Merapi), a form of local wisdom that should be understood by all members of society living around the mountain. The "Merapi Promise" contains the following message:

#### MERAPI PROMISE

Aku ora kalahan

(I am not always defeated)

Tur yo ora ngalah-ngalahake

(Nor do I overpower others)

Mung yo yen wis tekan janjiku

(But when my time has come)

Aku njaluk ngapuro

(I ask for forgiveness)

The Merapi Promise carries a deep meaning. The people of Cangkringan believe that Merapi is a manifestation of the Jagad Gede (the great universe) that can never be defeated. However, behind all of this, Merapi has brought blessings to the Cangkringan community. Therefore, although Merapi is feared, the people of Cangkringan still love it. They refuse to be relocated because, for them, their homeland is their birthplace and sacred land. This reflects the wisdom of the Cangkringan community, who are able to live harmoniously with nature and the environment in which they live.

#### 4.2. Signs Of Disasters According To The Community

Mr. Asih explained that Mount Merapi is considered to be in Alert status when rumbling sounds (gludug-gludug) begin to appear, followed by ash rain. This indicates that the community must immediately move to safer areas. I conducted an interview with BNPB Sleman to verify the signs that I obtained from the community. According to experts, the signs of an eruption are usually marked

by animals descending from the mountain, an increase in temperature, and mild tremors (interview, Sunday, August 2, 2015, at 16:00, at the house of Mr. Asih, the guardian of Mount Merapi).

Most people who have long lived side by side with Mount Merapi continue their daily activities as usual when there is only a slight change in temperature or when animals begin to descend from the mountain. This caused many people to be unprepared during the 2010 eruption, as they did not expect the eruption to be that massive. Mbah Harto shared his experience during the 2006 eruption, when the water springs began to decrease. The same thing happened during the 2010 eruption the water sources dried up (interview, Sunday, August 9, 2015, at 16:30, at the house of Mbah Harto, a Cangkringan resident).

Based on the experiences and knowledge of the community regarding the signs of Merapi eruptions, the author classified them into two categories: signs of Merapi in Alert status and signs of Merapi in Warning status. The signs are as follows:

##### 1. Signs of Mount Merapi Eruption in Alert Status

- The temperature around the mountain increases.
- Water springs start to dry up.
- Sometimes accompanied by mild tremors (earthquakes).
- Plants around the mountain begin to wither.
- Animals around the mountain start to migrate.

##### 2. b) Signs of Mount Merapi Eruption in Warning Status

- Loud rumbling sounds (gludug-gludug).
- Strong tremors (earthquakes).
- Ash rain.
- The arrival of hot clouds (wedus gembel).
- The appearance of flashes of fire from the mountain.

However, some community knowledge about disaster signs is not entirely accurate according to expert verification, including: 1. Volcanic eruptions, according to local wisdom, are usually accompanied by small earthquakes that produce rumbling sounds (greg-greg). However, experts explain that eruptions are not always followed by earthquakes, except when a volcanic eruption occurs together with a tectonic earthquake. 2. The community believes that Merapi eruptions usually occur on Fridays, as the 2010 eruption also happened on that day. The people of Cangkringan still believe that Friday is a sacred day. However, according to disaster experts, Merapi eruptions do not always occur on Fridays.

#### 4.3. Community Efforts To Pass Down Local Culture To The Next Generation

Based on field findings, it was shown that the community has actually made various efforts to pass down local wisdom knowledge about the signs of natural disasters to the next generation. Mr. Asih stated that he has carried out several efforts in this regard (interview, Sunday, August 2, 2015, at 16:00, at the house of Mr. Asih, the guardian of Mount Merapi).

1. Conveying the signs they understand about the arrival of a disaster to their children and grandchildren, for example, when a very loud rumbling sound (gludug-gludug) is heard, it indicates that an eruption may occur.
2. Advising their children and grandchildren to always remain vigilant.
3. The Labuhan ceremony tradition as a form of prayer and request for safety from God.
4. Building houses that always face the road, to make it easier to escape when an eruption occurs.
5. The Puter Desa tradition as a form of information or warning when Merapi is about to erupt.
6. Based on the information above, the researcher concluded that the community's wisdom can be divided into three stages: before, during, and after the disaster. Before the disaster, the elders usually convey the signs of an upcoming eruption, such as loud rumbling sounds (gludug-gludug), strong tremors, ash rain, the arrival of hot clouds (wedus gembel), and flashes of fire from the mountain. During the disaster, people usually recite the adhan (call to prayer) to alert others of the danger so they can immediately leave their homes and move to safer areas. After the disaster, the community performs the Labuhan ceremony as a form of surrender to God Almighty, acknowledging that everything belongs to Him and will eventually return to Him a reflection of the nrimo attitude, or sincere acceptance, toward the misfortune that has occurred.

#### 4.3 Practitioner's Input On Community Cultural Knowledge About Disaster Signs

The findings obtained from community respondents were then consulted with practitioners. Based on the input from practitioners, in this case, Mr. Makwan, S.T., M.T. (Head of the Sleman Regional Disaster Management Agency), it was

found that some of the information provided by the community was correct such as before an earthquake or volcanic eruption, there are signs like ash rain, animals making loud noises, and rumbling sounds ("grek-grek"). These signs may appear because the upcoming disaster is volcanic in nature, specifically a volcanic eruption.

In general, the signs of an impending natural disaster include:

1. Extreme weather and climate, such as high rainfall intensity, rising air temperature, the sudden formation of cumulus nimbus clouds in certain locations, and the increasing greenhouse effect.
2. Unusual or abnormal natural conditions, such as the recession of water in springs.

Drastic changes in animal behavior, for example:

- a) Large flocks of birds flying down to residential areas.
- b) The sudden emergence of animals that usually live underground, such as rats and snakes, to the surface before an eruption occurs.
- c) The restlessness and migration of wild animals such as tigers, forest wolves, and wild boars

#### 4.4. Discussion

The occurrence of natural disasters, whether volcanic eruptions, earthquakes, landslides, droughts, floods, or tsunamis, is unpredictable. However, it can be anticipated using the knowledge possessed by the community to niten (observe the signs) of an impending disaster. This information can reduce the risk of disasters if it is passed on to generations who have never experienced such events. The knowledge held by some of these generations is known as (local wisdom).

The application of local wisdom by the community in disaster preparedness is one of the effective mitigation efforts. Local wisdom, which was initially developed by the community and for the community, is generally well understood by the people, and in its implementation, it does not require much adjustment or socialization because the local population already has a deep understanding.

This study shows that the community has already transmitted knowledge about disaster signs and strategies for preparedness against the threat of Mount Merapi eruptions to the next generation. The community plays an active role that cannot be overlooked in building disaster preparedness among the population. In relation to the Hyogo Framework for Action, which was formulated by various countries to reduce disaster risk and build national resilience and disaster communication, this effort represents one form of implementing the framework,

namely by promoting community participation in disaster risk reduction. This initiative is also one of the starting points for disaster risk reduction through the exploration of knowledge about physical, social, economic, and environmental hazards and vulnerabilities possessed by the community.

The community still has many potentials that can be passed on to their descendants. On the other hand, certain roles within the community also require the support and experience of all stakeholders. Providing guidance to the younger generation, volunteering in various organizations, sharing experiences, and serving as a resource person on traditional knowledge are some of the roles the community can play for the advancement of young people. Proper dissemination of potential according to their physical and psychological conditions will bring happiness to the community. Therefore, it is time to examine the roles that the community can play in various fields, including efforts to establish a culture of disaster awareness.

From the perspective of the Javanese community, as stated in *Serat Margawitya* written by R.M.H. Djajaningrat I (Endraswara, 2013), one of the roles of parents towards their descendants is to provide pititur, meaning to give good advice. Related to efforts in building a community that has high preparedness against the threat of Mount Merapi eruptions. The advice given by parents, especially those conveyed by the Cangkringan community, is very meaningful for the younger generation, merapi eruption hazards, makes understanding early warning systems a necessity for the community that cannot be postponed.

## 5.CONCLUSION

This study shows that the community has the potential wisdom to respond to the environment. From the characteristics of traditional communities, they do not recognize knowledge scientifically, the community only uses titen knowledge (observing signs).

Based on field interviews, it appears that some community members who were respondents were able to recall events related to disasters in detail and clearly. This indicates that the community members who participated in this study have experience with Merapi eruptions.

**Acknowledgments:** The author thanks the Institute of Research and Community Service (LPPM) Yogyakarta PGRI University and the team of AJIB (International Journal of Reputation Acceleration) which has provided many criticisms and suggestions so that this article can be completed perfectly.

## REFERENCES

Based on interviews with all respondents, the community members who were respondents of this study have lived from a young age, so they gained experience regarding Merapi eruptions. In addition, the community has received stories from their ancestors about the signs of Merapi eruptions. Thus, the community plays a significant role in passing down local wisdom about disaster signs.

The next finding of this study is that some of the local wisdom knowledge conveyed by the community is rationally correct, if it aligns with what practitioners have presented scientifically. However, there are also aspects that are incorrect, more commonly known as myths. Therefore, continuous studies of knowledge derived from community wisdom are necessary. Efforts that can be made include, for example, academics organizing discussion forums or meetings with village elders in the area to discuss local wisdom based on disaster mitigation and preparedness.

The role of academics here is to integrate local wisdom within the context of indigenous communities into scientific studies, so that the results can be scientifically accountable and published to the local community without eliminating the accompanying local elements. The findings can also be compiled into books so that the target coverage can reach a wider audience. In this way, local wisdom knowledge that has been verified by experts can reach the entire community because, essentially, the application of local wisdom by the community in reducing risk, facing, and saving themselves from Merapi eruptions has provided many valuable lessons for practitioners and policymakers regarding the importance of community wisdom in risk reduction. Consequently, local wisdom from the community can be understood as one model of community preparedness in disaster risk management.

### 5.1. *Finding*

The author thanks the Institute of Research and Community Service (LPPM) Yogyakarta PGRI University and the team of AJIB (International Journal of Reputation Acceleration) which has provided many criticisms and suggestions so that this article can be completed perfectly.

Anonim. (2006). *Kerangka Aksi Hyogo: Pengurangan Risiko Bencana 2005–2015 membangun ketahanan bangsa dan komunitas terhadap bencana* (Terjemahan oleh Wuryanti T.). Jakarta: Masyarakat Penanggulangan Bencana Indonesia.

Armanto, D., Marzunita, Saprudin, Sudarja, M., Royan, A., Wijayanti, D., Iwan, & Sarsih. (2007). *Bersahabat dengan ancaman*. Jakarta: PT Gramedia Widiasarana Indonesia.

Ayriza, Y., Fathiyah, K. N., Nurhayati, S. R., & Nur Wangit. (2009). *Pengembangan modul bimbingan pribadi sosial untuk meningkatkan kesiapan psikologis menghadapi bencana alam pada siswa SMA di DIY*. Laporan Penelitian Hibah Bersaing. Yogyakarta: Lemlit UNY. Tidak diterbitkan.

Badan Pelatihan Orientasi Pengurangan dan Manajemen Risiko Bencana. (2006). *Pelatihan orientasi pengurangan dan manajemen risiko bencana*. Magelang, 6–8 Desember 2006.

BKKBN. (2002). *Data dan informasi penduduk Indonesia*. Jakarta: Bidang Pengembangan Informasi Kependudukan.

Elshaer, I. A., Azazz, A. M. S., & Fayyad, S. (2024). Residents' environmentally responsible behavior and tourists' sustainable use of cultural heritage: Mediation of destination identification and self-congruity as a moderator. *Heritage*, 7(3), 1174. <https://doi.org/10.3390/heritage7030056>

Emadlou, N., Velikova, N., Yuan, J. J., Jones, R. P., & Jai, T.-M. C. (2025). Tasting place: How memorable food-based experiences create responsible tourists. *Tourism Review International*, 29(1), 71–92. <https://doi.org/10.3727/194344225X17315216888943>

Evangeline, Y., Rahayu, S., & Tedjakusuma, A. (2025). The effect of service quality, tourist satisfaction, and place attachment on environmentally responsible behavior in Praijing traditional village. *Southeast Asian Journal of Service Management*, 2(1), 59–67. <https://doi.org/10.24123/seajsm.v27>

Fan, X., Yao, L., Shi, B., Wang, J., Wu, G., & Shen, W. (2025). The effect of mixed emotions on the behavioral intentions of tourists at overseas Chinese cultural heritage sites: Place attachment and memorable tourism experience as mediators. *Journal of Tourism and Cultural Change*, 1–20. <https://doi.org/10.1080/14766825.2025.2465346>

Fathiyah, K. N., & Harahap, F. (1996). *Penerapan metode bercerita dan bermain untuk kesiapan psikologis menghadapi bencana alam pada anak TK*. Laporan Penelitian. Yogyakarta: BK FIP UNY. Tidak diterbitkan.

Ferreira da Silva, M., Martins, F., Costa, C., & Pita, C. (2024). Visitors' experience in a coastal heritage context: A segmentation analysis and its influence on in situ destination image and loyalty. *European Journal of Tourism Research*, 37, 3705. <https://doi.org/10.54055/ejtr.v37i.3238>

Fu, Y., & Luo, J. M. (2023). An empirical study on cultural identity measurement and its influence mechanism among heritage tourists. *Frontiers in Psychology*, 13, 1032672. <https://doi.org/10.3389/fpsyg.2022.1032672>

Gautam, V. (2022). Examining relationships among festival satisfaction, place attachment, emotional experience, and destination loyalty. *Leisure Sciences*, 47(2), 348–365. <https://doi.org/10.1080/01490400.2022.2099493>

Ghosh, P., Jha, S. S., & Bowal, S. (2025). Heritage value dimensions and tourist intention towards sustainable heritage conservation: A mediating role of destination attachment. *GeoJournal of Tourism and Geosites*, 58(1), 296–305. <https://doi.org/10.30892/gtg.58126-1411>

Hendra. (2010). Bencana dan kearifan lokal. Artikel. *Pusat Informasi Bencana*. Diakses 14 Agustus 2015.

Hidayat, R. (2006). *Model tiga faktor untuk analisis kebutuhan dan kerangka penanganan dampak psikologis gempa bumi 27 Juni 2006 di Yogyakarta dan sekitarnya*. Makalah. Disampaikan dalam Pelatihan Relawan Gempa Bumi DIY, 11–12 Juni 2006.

Huang, T., & Zhang, Y. (2024). 'Roots' tourists' personal heritage experience: An extended cognitive-affective-conative model. *Journal of Hospitality and Tourism Management*, 61, 212–223. <https://doi.org/10.1016/j.jhtm.2024.10.009>

Kang, S., Woo, G. K., & Lee, S. (2025). Using nostalgia to increase tourists' destination loyalty in heritage cities: From imagined to productive nostalgia. *International Journal of Urban Sciences*, 29(1), 195–220. <https://doi.org/10.1080/12265934.2025.2452511>

Keraf, A. S. (2006). *Etika lingkungan*. Jakarta: Penerbit Buku Kompas.

Kim, E., Kim, S., & Jeong, Y. (2024). The 18th FINA World Masters Championships and destination loyalty. *Asia Pacific Journal of Marketing and Logistics*, 36(3), 622–640. <https://doi.org/10.1108/APJML-04-2023-0294>

Kolibri. (2012). Kearifan lokal sebagai upaya PRB yang efektif: *In a nutshell*. Artikel. Diakses 14 Agustus 2015.

Kusnayain, Y. I., & Hussein, A. S. (2025). Predicting Indonesia's urban heritage tourist loyalty: The impact of memorable tourism experience, cultural destination image, and cultural motivation. *International Journal of Analysis and Applications*, 23, 50–50. <https://doi.org/10.28924/2291-8639-23-2025-50>

Kusumah, E. P. (2024). Sustainable tourism concept: Tourist satisfaction and destination loyalty. *International Journal of Tourism Cities*, 10(1), 166–184. <https://doi.org/10.1108/IJTC-04-2023-0074>

Lee, S., Kim, T., & Kim, Y. H. (2024). Heritage tourism and allegiance development: A study of the Korean demilitarized zone. *Journal of Vacation Marketing*. <https://doi.org/10.1177/13567667241249178>

Lewicka, M. (2011). On the varieties of people's relationships with places: Hummon's typology revisited. *Environment and Behavior*, 43(5), 676–709. <https://doi.org/10.1177/0013916510364917>

Li, J., Peng, X., Liu, X., Tang, H., & Li, W. (2024). Shaping tourists' conservational intentions toward cultural heritage in the digital era. *Journal of Asian Architecture and Building Engineering*, 1–20. <https://doi.org/10.1080/13467581.2024.2321999>

Li, X., & Wang, C. (2023). Understanding the relationship between tourists' perceptions of authenticity and behavioural intentions. *Asia Pacific Journal of Tourism Research*, 28(3), 254–273. <https://doi.org/10.1080/10941665.2023.2217959>

Luong, T.-B. (2025). The role of place attachment in ecotourism intention. *International Journal of Geoheritage and Parks*, 13(1), 31–43. <https://doi.org/10.1016/j.ijgeop.2025.02.001>

Mo, L., Goh, Y. N., & Luo, Y. (2023). The influence of tourist involvement and loyalty at rural festivals. *International Journal of Operations and Quantitative Management*, 29(1), 83–107.

Mohamed, M. E., Abdelhakim, A., & Hewedi, M. (2025). Can food-based self-congruity drive tourist behavioral intentions? *Journal of Hospitality and Tourism Insights*. <https://doi.org/10.1108/JHTI-09-2024-0974>

Munfangati, T. (1998). *Keutamaan moral dalam budaya Jawa dalam Serat Margawirya*. Yogyakarta: Lembaga Studi Jawa.

Obradović, S. (2024). Sacred journeys: Exploring emotional experiences and place attachment in religious tourism. *Religions*, 15(6), 654. <https://doi.org/10.3390/rel15060654>

Oorgaz-Agüera, F., Puig-Cabrera, M., Moral-Cuadra, S., & Domínguez-Valerio, C. M. (2025). Authenticity of architecture, place attachment, identity, and support for sustainable tourism. *Tourism and Hospitality Management*, 31(1), 81–92. <https://doi.org/10.20867/thm.31.1.1>

Paripurno, E. K. (2015). *Perencanaan pembangunan sensitif bencana*. Makalah. Pelatihan PRB, Magelang.

Pemda Kabupaten Sleman. (2011). *Laporan komando tanggap darurat bencana*. Kantor PBA. Tidak diterbitkan.

Perry, M. (2024). Role of cultural heritage preservation in destination branding. *Hospitality and Tourism Journal*, 1(1), 36–47.

Rahardjo, S. T. (2012). Kearifan lokal dalam pengurangan risiko bencana. Artikel. Diakses 14 Agustus 2015.

Ramadania, R., Reswari, R. A., Rahmawati, R., Rosyadi, R., Purmono, B. B., & Afifi, M. Z. (2025). City identity in tourist intention. *Cogent Business & Management*, 12(1), 2474270. <https://doi.org/10.1080/23311975.2025.2474270>

Rezapouraghdam, H., Akhshik, A., Strzelecka, M., Roudi, S., & Ramkissoon, H. (2024). Fascination, place attachment, and environmental stewardship. *Tourism Recreation Research*, 1–17. <https://doi.org/10.1080/02508281.2024.2434793>

Rodrigues, R., Madeira, A., & Palrão, T. (2024). Brand image and revisit intention. *Journal of Destination Marketing & Management*, 33, 100927. <https://doi.org/10.1016/j.jdmm.2024.100927>

Sasongko, G., Kameo, D. D., Siwi, V. N., Wahyudi, Y., & Huruta, A. D. (2025). Service quality, heritage tourism, and loyalty. *Heritage*, 8(2), 77. <https://doi.org/10.3390/heritage8020077>

Shimray, S. R., & Ramaiah, C. K. (2019). Cultural heritage awareness among students. *Library Philosophy and Practice*, 2516.

Sthapit, E., Björk, P., Coudounaris, D. N., & Jiménez-Barreto, J. (2024). Memorable halal tourism experience. *International Journal of Hospitality & Tourism Administration*, 25(3), 575–601. <https://doi.org/10.1080/15256480.2022.2135666>

Suharti. (2008). *Peran lansia dalam pelestarian budaya*. Laporan Penelitian. Yogyakarta: Lembaga Penelitian UNY.

Sutikno, W. (2008). Pengantar penanggulangan bencana. Modul Pelatihan Kesiapsiagaan dan Mitigasi Bencana. Yogyakarta: Dinas PBA Sleman.

Suwarjo. (2009). *Peran lansia dalam pelestarian lingkungan hidup*. Laporan Penelitian. Yogyakarta: Lembaga Penelitian UNY.

Swasono, M. F. (1995). *Peranan dan kontribusi usia lanjut*. Laporan Penelitian. Jakarta: FISIP.

Tian, D., Wang, Q., Law, R., & Zhang, M. (2020). Influence of cultural identity on tourist loyalty. *Sustainability*, 12(16), 6344. <https://doi.org/10.3390/su12166344>

UNDP. (2006). *Kerangka acuan pelaksanaan pelatihan orientasi pengurangan dan manajemen risiko bencana*. Paper. Tidak diterbitkan.

Widyastuti, S. H. (2002). *Kearifan lokal masyarakat Jawa dalam teks Jawa abad XVIII–XIX*. Laporan Penelitian. Yogyakarta: Universitas Negeri Yogyakarta.

Xu, L., Zhang, J., & Nie, Z. (2022). Role of cultural tendency and involvement in heritage tourism experience. *Land*, 11(3), 370. <https://doi.org/10.3390/land11030370>

Xu, Y., Xia, F., & Fu, X. (2025). Stimulating resident tourists' place attachment via festivals. *Journal of China Tourism Research*, 21(1), 214–235. <https://doi.org/10.1080/19388160.2024.2326975>

Ye, J., Qin, Y., & Wu, H. (2024). Cultural heritage and sustainable tourism. *Current Psychology*, 43(47), 36393–36415. <https://doi.org/10.1007/s12144-024-07070-6>

Zhao, Z.-F., & Li, Z.-W. (2023). Destination authenticity, place attachment, and loyalty. *Current Issues in Tourism*, 26(23), 3887–3902. <https://doi.org/10.1080/13683500.2022.2153012>