



Development of a Community-Based Landslide Early Warning System Through a Disaster Literacy Program Using Climate and Weather Information in Kemambang, Banyubiru

Supriyadi^{1*}, Khumaedi, Sunarno¹, Siti Wahyuni¹, Agus Yulianto¹, Fianti¹, Nishfa Mufatihah¹, Abdul Latif¹, Sri Endah¹, Suraji², Rodhotul Muttaqin¹

¹Prodi Magister Fisika, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Negeri Semarang, Indonesia, 502291

²Dinas Pendidikan, Kebudayaan, Kepemudaan dan Olahraga Kabupaten Semarang, Jawa Tengah, 50661, Indonesia.

ARTICLE INFO

Article History

Received : Jun, 3, 2026

1st Revision : Jul, 31, 2026

Accepted : Jul, 31, 2026

Available Online : Oct, 15, 2026

Keywords:

Community-based early warning system; Community disaster literacy; Climate information; Landslide mitigation; WhatsApp-based communication

ABSTRACT

Kemambang Village, located in Banyubiru District, Semarang Regency, is highly susceptible to landslides due to its hilly topography and high rainfall intensity. Preliminary observations and discussions with village officials and community representatives indicated that many residents had limited understanding of how to interpret climate and weather information issued by the Meteorology, Climatology, and Geophysics Agency (BMKG) for landslide preparedness. This community service program aimed to develop a community-based landslide early warning system by integrating climate and weather information with participatory education, scenario-based simulations, and digital communication through the “Masyarakat Pemerhati BMKG” WhatsApp group. The program was conducted on July 26, 2025, at the Kemambang Village Hall, Banyubiru District, Semarang Regency, involving 25 participants consisting of village officials, community representatives, and local stakeholders. Program evaluation was conducted using pretest-posttest assessments and a reflective questionnaire. The average pretest score increased from 28.42 to 32.32 in the posttest, indicating an improvement in participants’ short-term understanding after the program. Reflective questionnaire results further showed that 84% of participants demonstrated adequate understanding of the training materials, 72% had previous disaster experience, 51% exhibited environmental awareness, and 93% expressed interest in participating in follow-up disaster mitigation activities. The WhatsApp group was established as a community communication platform for disseminating official BMKG weather information and supporting continuous disaster preparedness after the training. In addition, educational videos and disaster mitigation posters were developed to strengthen public awareness. These findings indicate that integrating climate and weather information with participatory education, community-based communication, and digital follow-up can improve short-term community understanding and support the development of a sustainable community-based landslide early warning system in Kemambang Village.

*Corresponding Author

Email address:

supriyadi@mail.unnes.ac.id

[Dedikasi: Community Service Reports](http://jurnal.uns.ac.id/dedikasi) by UNS is licensed under Creative Commons Attribution



1. INTRODUCTION

Indonesia is one of the countries with a high level of vulnerability to hydrometeorological disasters,

such as floods, landslides, and strong winds, which are increasing due to climate change and extreme weather (Kemhan, 2025). Landslides are defined as the movement of soil and rock masses downslope under the influence of gravity, high rainfall, and unstable geological conditions (BPBD Buleleng, 2024).

According to the Central Java Regional Disaster Management Agency (BPBD), hydrometeorological disasters such as floods, landslides, and strong winds have consistently dominated disaster events in Central Java. This condition highlights the importance of strengthening disaster mitigation efforts through the utilization of climate and weather information (BPBD Central Java, 2025). This condition highlights the importance of sustainable disaster mitigation efforts based on the utilization of climate and weather information.

Table 1. Number of hydrometeorological disaster occurrences in Central Java during 2022 based on BPBD Central Java records.

Jenis Bencana	Jumlah Kejadian
Tanah Longsor	1.010
Angin Kencang/Cuaca Ekstrem	488
Banjir	374

Source: Central Java Regional Disaster Management Agency (BPBD Central Java), Disaster Recapitulation Data, 2022

According to the Central Java Regional Disaster Management Agency (BPBD), hydrometeorological disasters, including floods, landslides, and extreme weather events, dominated disaster occurrences in Central Java. Based on BPBD records in 2022, landslides accounted for 1,010 incidents, followed by extreme weather (488 incidents) and floods (374 incidents), highlighting the need to strengthen disaster mitigation through the utilization of climate and weather information.

The use of climate and weather information is a crucial element in early warning systems and disaster risk mitigation (BMKG, 2023; Hossain et al., 2023). An effective disaster information system should meet indicators such as accessibility, flexibility, alignment with community expectations, and specific functions to support early warning (Azizah et al., 2022). In addition, the application of digital communication technologies, such as the integration of BMKG data through applications and social media, can accelerate the dissemination of information to communities in disaster-prone areas (Wijaya & Sari, 2023).

Geographically, Semarang Regency, particularly Banyubiru District, has varied topography ranging from lowlands to steep hills surrounding the slopes of Mount Telomoyo and Mount Kelir (Sukmawan et al., 2024). According to the Regional Disaster Management Agency (BPBD) of Semarang Regency, Banyubiru District is one of the areas prone to landslides due to steep slopes and high rainfall during the rainy season. In addition, several landslide incidents have been reported in the district in recent years, indicating the need for strengthening community preparedness. Kemambang Village is one of the areas with high landslide susceptibility because of its geomorphological conditions and significant slope gradients (Yuliana & Hartono, 2023). Therefore, improving community literacy regarding climate and weather information is essential to strengthen preparedness and mitigation at the local level (UNDRR, 2023).

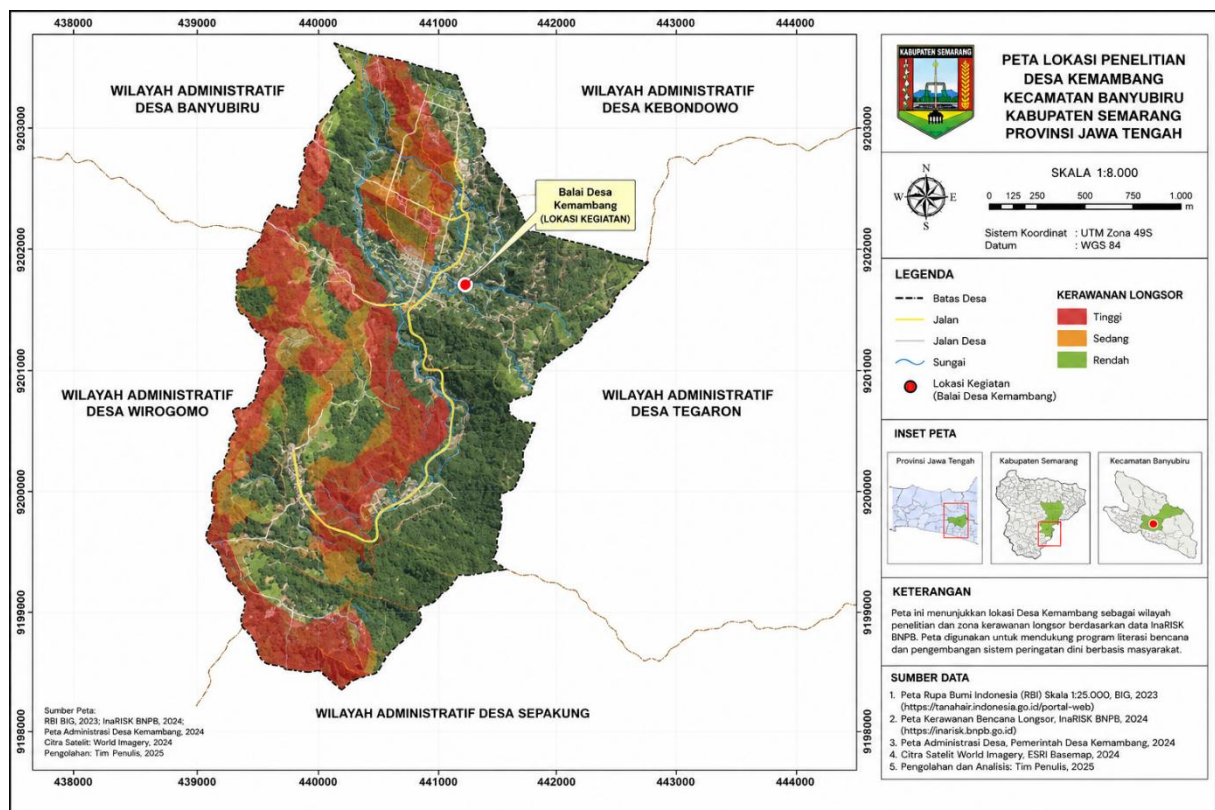


Figure 1. Map of Kemambang Village, Semarang Regency
Source: <http://kemambang.banyubiru.semarangkab.go.id>

This study aims to enhance the understanding of the Kemambang Village community regarding climate and weather information and its application in landslide mitigation. In addition, the program introduced the utilization of official BMKG services, including daily weather forecasts, extreme weather early warnings, rainfall information, and the Info BMKG mobile application. To support continuous communication and disaster preparedness, this information was disseminated through the *Masyarakat Pemerhati BMKG* WhatsApp group, which served as a community-based communication platform for sharing official BMKG updates and disaster education (BPBD Buleleng, 2024).

3. METHOD OF IMPLEMENTATION

This community service activity was conducted on July 26, 2025, at the Kemambang Village Hall, Banyubiru District, Semarang Regency. This community service activity was conducted on July 26, 2025, at the Kemambang Village Hall, Banyubiru District, Semarang Regency. A total of 25 community members participated in the program, consisting of village officials, community leaders, members of local community organizations, and residents living in landslide-prone areas. The one-day program was organized into four sessions, including program introduction and pretest, participatory education on climate and weather information, scenario-based disaster mitigation simulation, and discussion followed by posttest and program evaluation. To support the sustainability of the program, a WhatsApp group named "Masyarakat Pemerhati BMKG" was established as a communication platform for sharing official BMKG weather information and disaster preparedness updates.

The implementation method was divided into three main stages: preparation, implementation, and evaluation, as recommended by community-based participatory activity models (Nurhadi et al.,

2021; Wicaksono et al., 2022; Wiyoko et al., 2020). This approach is considered effective in enhancing active community involvement in disaster education processes and ensuring the sustainability of program outcomes (Sulastri et al., 2020; Ramadhan & Putri, 2023). The stages of the community service activity are described as follows:

a. Preparation Stage

The preparation stage began with field observations to identify disaster-related problems faced by the Kemambang Village community. Observations were conducted through direct surveys and informal interviews with village officials and residents affected by landslide risks. This process was coordinated with BMKG Central Java to obtain data related to climate patterns and extreme rainfall, as well as with the Regional Disaster Management Agency (BPBD) of Semarang Regency to gather information on previously implemented landslide mitigation strategies.

In addition, participant data collection was carried out by involving representatives from each neighborhood unit (Rukun Warga/RW) to ensure inclusive and diverse community participation. This approach aimed to ensure that the program outcomes could reach all segments of the village community evenly (Sari & Utami, 2022).

Participants were invited through coordination with the Kemambang Village Government. The selection aimed to ensure representation from village officials, Babinsa, Bhabinkamtibmas, community leaders, and residents living in areas vulnerable to landslides. As this activity was implemented as a community service program, participant recruitment was facilitated by the village government based on local needs and community representation rather than a predetermined quota from each neighborhood (RW).

b. Implementation Stage

The implementation stage included interactive lectures, participatory discussions, digital media socialization, and field simulations. The materials presented covered:

1. Basic understanding of climate and weather and their relationship to landslide potential (BMKG, 2023);
2. Dissemination of Law Number 24 of 2007 concerning Disaster Management (Government of the Republic of Indonesia, 2007);
3. Introduction to basic principles of landslide risk reduction through safe land-use planning and general recommendations for construction in landslide-prone areas. The session was delivered by a resource person from the Semarang Regency Regional Disaster Management Agency (BPBD) as part of disaster mitigation education. Participants were also introduced to official BMKG services, including daily weather forecasts, extreme weather early warnings, rainfall information, and the Info BMKG mobile application. To facilitate continuous communication, a WhatsApp group was established as a community platform for disseminating official BMKG information and supporting rapid communication among residents. Recommendations related to structural mitigation and construction practices remain subject to site-specific assessments conducted by authorized experts

The resource persons were from BMKG Central Java and BPBD Semarang Regency, while the implementation of the activities was facilitated by an academic team acting as technical assistants (Wijaya & Sari, 2023). The use of digital media for socialization was chosen due to its effectiveness in

expanding the reach of disaster education and strengthening community communication networks in rural areas (Hossain et al., 2023).

c. Evaluation Stage

The evaluation stage was conducted to assess the effectiveness of the program in improving participants' understanding of climate and weather information for landslide disaster mitigation. The evaluation employed a one-group pretest–posttest design. The instrument consisted of 35 multiple-choice questions covering climate and weather information, landslide risk factors, early warning systems, disaster preparedness, and mitigation strategies. Each correct answer was scored as one point, while incorrect answers received zero points, resulting in a maximum score of 35. The instrument was developed based on the educational materials delivered during the activity and reviewed by the community service team through expert judgment to ensure its content suitability. Data were analyzed descriptively by comparing the average pretest and posttest scores, calculating score differences, and determining the normalized gain (N-Gain) to measure the improvement in participants' understanding.

In addition to the pretest–posttest assessment, participant reflections were collected using a questionnaire consisting of 20 items. The questionnaire was organized into four aspects: material comprehension (9 items), disaster experience (2 items), environmental awareness (5 items), and interest in disaster mitigation activities (4 items). The questionnaire employed dichotomous (Yes/No) responses, with each affirmative response scored as one and each negative response scored as zero. The results for each aspect were calculated descriptively and presented as percentages of positive responses. The questionnaire was developed based on the objectives and learning materials of the community service program and reviewed through expert judgment by the community service team to ensure the relevance and appropriateness of its content. This evaluative approach was used to assess participants' understanding, awareness, and responses toward the implemented program (Yuliana & Hartono, 2023).

The evaluation results were then analyzed descriptively to determine the level of improvement in disaster literacy among the Kemambang Village community and the effectiveness of digital media as an educational tool for mitigation (Azizah et al., 2022).

4. RESULTS AND DISCUSSION

Through a socialization program involving BMKG Central Java Province and the Regional Disaster Management Agency (BPBD) of Semarang Regency, the community of Kemambang Village was provided with education on the use of climate and weather information as a basis for early warning systems and non-structural mitigation strategies. This activity emphasized not only knowledge transfer but also simple practices relevant to local conditions, as well as the use of digital media as a tool for continuous communication. Therefore, this community service program is expected to enhance disaster literacy while fostering a disaster-aware culture at the village level.

a. Preparation Stage

The preparation stage began with field observations in Kemambang Village, Banyubiru District, Semarang Regency. This activity aimed to identify topographical conditions, land-use patterns, and the level of regional vulnerability to potential landslides. Based on the observations, it was found that most areas of Kemambang Village are located on relatively steep hillside slopes, which geologically classify the area as having a high potential for ground movement. In addition, land-clearing practices without

the application of soil and water conservation principles were still observed, which may exacerbate landslide risks during the rainy season.

These field findings were further confirmed through consultations with BMKG Central Java, which indicated an increasing trend in extreme rainfall intensity in the Banyubiru area in recent years (BMKG, 2023). Furthermore, coordination with BPBD Semarang Regency reinforced that Kemambang Village is categorized as a high landslide-risk area (BPBD Central Java, 2022). This preparation stage served as a crucial foundation to ensure that the community service activities were based on valid data, real field conditions, and supported by relevant technical institutions.

b. Implementation Stage

The socialization activity was conducted on Saturday, July 26, 2025, at the Kemambang Village Hall, Banyubiru District, Semarang Regency. The activity was attended by 25 participants who were purposively selected by the village government to represent key community groups from landslide-prone areas. The participants consisted of village officials, Babinsa, Bhabinkamtibmas, community leaders, and community representatives from several neighborhood units (RW) considered vulnerable to landslides. This composition was intended to ensure that the information and knowledge gained during the program could be disseminated to the wider community through local representatives. The resource persons consisted of three experts: Sri Endah and Abdul Latif from BMKG Central Java Province, and Alexander Gunawan Tribiantoro, S.T.P., M., from BPBD Semarang Regency.

The socialization materials were designed to improve community understanding and awareness of the importance of climate and weather information in disaster mitigation. The first topic covered the basic understanding of weather and climate information, including the differences between weather and climate, seasonal rainfall patterns, and their relationship to landslide occurrences. The second topic emphasized the introduction of climate elements such as rainfall, temperature, humidity, and wind direction, enabling the community to recognize environmental changes that may trigger disasters. The third topic focused on landslide mitigation strategies, both structural—such as simple drainage construction, slope reinforcement, and vegetation planting—and non-structural approaches, including awareness-building, preparedness, and risk communication at the community level.

The materials were delivered through interactive lectures followed by participatory discussions. Participants were given the opportunity to ask questions and share their experiences regarding environmental conditions around their homes. One of the key outcomes of this activity was the establishment of a WhatsApp group called “Masyarakat Pemerhati BMKG” as a rapid communication platform for disseminating weather information and early disaster warnings at the local level.

In addition, the activity included simple simulations focusing on initial disaster mitigation measures, such as identifying early signs of landslides (e.g., the appearance of ground cracks and changes in water flow direction), basic evacuation procedures, and efforts to maintain a safer environment around residential areas.



Figure 2. Documentation of Community Service Activities: (a) Group photo with participants, (b) Material presentation

The implementation results showed that participants actively engaged in discussions and simulation activities throughout the program, reflecting a high level of participation during the learning process. This observation was consistent with the quantitative evaluation, in which the average pretest score increased from 28.42 to 32.32 after the activity. Furthermore, the reflective questionnaire indicated that most participants demonstrated a good understanding of the training materials and expressed strong interest in participating in follow-up disaster mitigation activities. These findings suggest that the combination of lectures, participatory discussions, simulations, and digital communication effectively supported participants' short-term understanding of landslide disaster mitigation.

c. Evaluation Stage

The effectiveness of the program was evaluated using a one-group pretest–posttest design to measure changes in participants' knowledge of climate and weather information for landslide mitigation (Figure 3 and Table 2). Based on the completed evaluation forms, the average pretest score increased from 28.42 ± 3.47 to 32.32 ± 2.08 after the educational activity, with an average score improvement of 3.89 points and a moderate N-Gain value. These results indicate an improvement in participants' short-term understanding following the program. In addition, the reflective questionnaire showed that 84% of participants reported adequate understanding of the training materials after the activity, while 16% indicated that they still required further guidance, particularly in interpreting extreme weather information and implementing community-based landslide mitigation measures.



Figure 3. Pre-test and Post-test Questionnaire Administration**Table 2.** Descriptive Statistics of Participants' Pretest and Posttest Scores

Parameter	Pretest	Posttest
Jumlah data yang dianalisis	19	19
Jumlah soal	35	35
Skor maksimum	34	35
Skor minimum	21	28
Mean $\pm$ SD	28.42 $\pm$ 3.47	32.32 $\pm$ 2.08
Rata-rata peningkatan	-	3.89
Rata-rata N-Gain	-	0.65 (Sedang)

The community service program involved 25 participants. Quantitative evaluation using the pretest–posttest instrument was conducted based on 19 completed response sets. The average pretest score increased from 28.42 $\pm$ 3.47 to 32.32 $\pm$ 2.08, with an average gain of 3.89 points and a mean N-Gain of 0.65, indicating a moderate improvement in participants' understanding.

Based on the non-cognitive evaluation results, 72% of participants had previous experience in disaster-related activities, while 28% were participating in such activities for the first time. In terms of environmental awareness, only 51% of participants demonstrated a high level of concern, indicating that community awareness of environmental management and disaster risk reduction still requires further strengthening. This finding suggests that improving disaster resilience requires not only increasing knowledge but also fostering sustainable behavioral changes through continuous community engagement. Encouragingly, 93% of participants expressed high curiosity and motivation to learn, indicating a strong willingness to participate in future disaster preparedness activities. Therefore, follow-up efforts will be supported through the *Masyarakat Pemerhati BMKG* WhatsApp group, dissemination of official BMKG weather information, and community-based evacuation simulations to reinforce preparedness and promote long-term disaster-aware behavior.

These findings indicate that a combined approach involving lectures, participatory discussions, simple simulations, and the use of digital media is proven to be effective in improving disaster literacy and mitigation awareness at the community level. However, the main challenge moving forward lies in enhancing environmental awareness in a sustainable manner, so that non-structural mitigation efforts do not remain merely at the level of knowledge, but evolve into habitual practices and a resilient disaster-aware culture within the community.

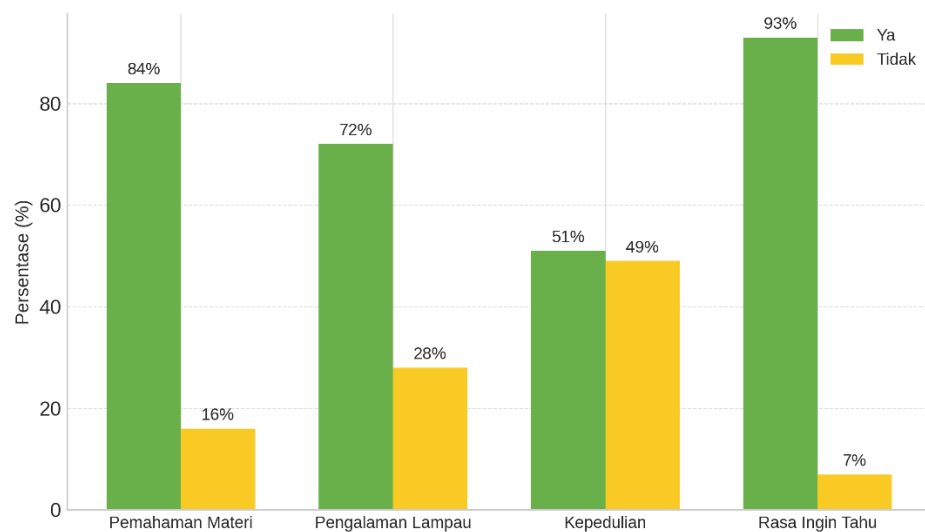
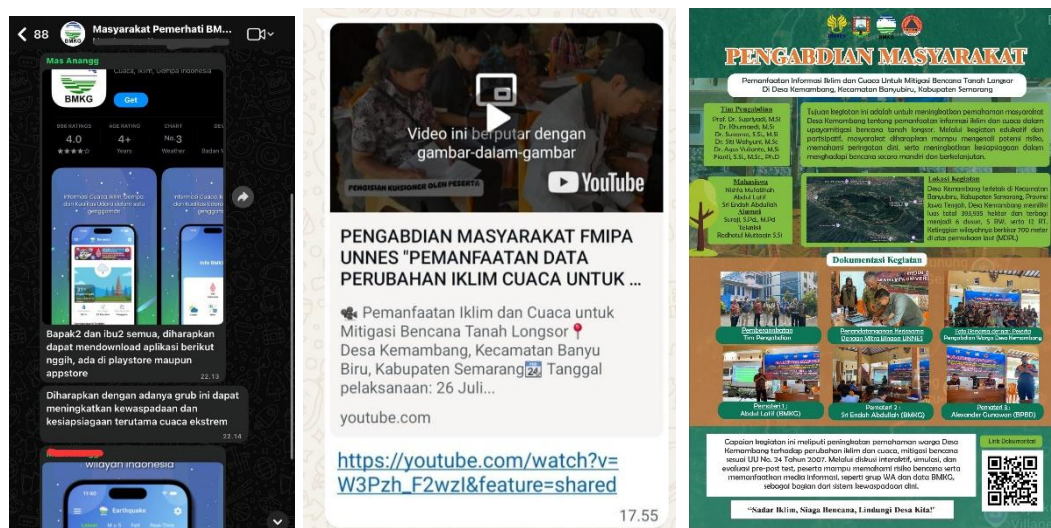


Figure 4. Results of the Participant Reflection Questionnaire

In addition to evaluation through questionnaires, this activity also produced outputs in the form of disaster education media. The first output is a documentation video uploaded to a YouTube channel (Figure 6a) as a means of broader information dissemination, extending beyond the immediate participants of the socialization program. The video contains a summary of the materials, activity documentation, and participant testimonials, allowing it to function as a learning resource for the wider community.

The second output is an educational poster on landslide disaster mitigation (Figure 6b), designed to be simple, communicative, and easy to understand. The poster includes concise information on early warning signs of landslides, basic mitigation measures, and emergency contact information that can be reached during disaster situations.



Source: https://youtu.be/W3Pzh_F2wzl?feature=shared

Figure 5. Outputs of the Activity as Educational Materials

The sustainability of the program was supported not only through educational videos and disaster mitigation posters, but also through the establishment of the *Masyarakat Pemerhati BMKG* WhatsApp group as a post-program communication platform. This group enables continuous dissemination of official weather and climate information from BMKG, promotes the use of the Info BMKG mobile application, and facilitates communication between the community and the community service team regarding disaster preparedness. Consequently, participants can continuously access educational materials and receive updated weather information beyond the one-day activity, thereby strengthening community-based disaster preparedness.

5. CONCLUSION

The community service activity conducted in Kemambang Village, Banyubiru District, successfully improved residents' understanding of the use of climate and weather information in landslide disaster mitigation efforts. Based on the evaluation results, 84% of participants demonstrated an increase in their understanding of the material, 72% had prior experience in disaster-related activities, 51% showed a high level of environmental awareness, and 93% expressed strong curiosity toward mitigation practices. In addition, the activity produced educational outputs in the form of a learning video uploaded to a YouTube channel and an informational mitigation poster that can be utilized by the community on a sustained basis. These findings indicate that a combination of lectures, discussions, simulations, and the use of digital media is effective in enhancing disaster literacy at the community level.

As a follow-up, it is recommended that similar activities be carried out continuously, with greater emphasis on practical field-based approaches such as evacuation simulations and environmental conservation training. The village government, together with relevant institutions such as BMKG and BPBD, is expected to further optimize the use of digital media including WhatsApp Groups and YouTube channels as tools for communication and community-based early warning systems. In this way, the program not only increases community knowledge but also fosters a disaster-aware culture that plays a crucial role in strengthening the resilience of Kemambang Village against landslide hazards.

6. ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to: (1) the Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang (FMIPA UNNES), for funding this activity through the budget implementation document (DPA FMIPA UNNES No. DPA: 139.03.2.693449/2025) in accordance with the agreement letter for the implementation of community service for lecturers (Faculty Fund DPA FMIPA UNNES 2025, No. 65.21.4/UN37/PPK.04/2025); (2) the Meteorology, Climatology, and Geophysics Agency (BMKG) of Central Java Province; (3) the Regional Disaster Management Agency (BPBD) of Semarang Regency for their support and participation as resource persons in the socialization and education activities on landslide disaster mitigation; (4) the Government of Kemambang Village, Banyubiru District, for granting permission, facilities, and full support during the implementation of the activity; and (5) the community of Kemambang Village for their enthusiasm and active participation throughout the program.

REFERENCE

Azizah, N., Rahmawati, D., & Kurniawan, H. (2022). Pengaruh perubahan iklim terhadap bencana

- hidrometeorologi di Indonesia (2010–2020). *Jurnal Pendipa*, 3(2), 120–128. <https://ejournal.unib.ac.id/pendipa/article/download/20192/9476/53979>
- Badan Meteorologi, Klimatologi, dan Geofisika (BMKG). (2023). Atlas proyeksi bencana hidrometeorologi–Longsor. <https://iklim.bmkg.go.id/bmkgadmin/storage/buletin/Atlas%20Proyeksi%20Bencana%20Hidrometeorologi%20-%20Longsor.pdf>
- BPBD Buleleng. (2024). Bencana hidrometeorologi di Indonesia. https://bpbd.bulelengkab.go.id/informasi/detail/artikel/63_bencana-hidrometeorologi
- Badan Penanggulangan Bencana Daerah Provinsi Jawa Tengah. (2025, March 10). *Jawa Tengah dikepung bencana: 407 ribu jiwa terdampak*. <https://bpbd.jatengprov.go.id/akumulasi-bencana-jateng-2025/>
- Dewan Perwakilan Rakyat Republik Indonesia (DPR RI). (2025). Mitigasi bencana hidrometeorologi di Indonesia: Urgensi kebijakan dan kesiapsiagaan masyarakat. *Info Singkat XVII(3)*, 1–8. https://berkas.dpr.go.id/pusaka/files/info_singkat/Info%20Singkat-XVII-3-I-P3DI-Februari-2025-198.pdf
- Hossain, M. A., Lee, D., & Choi, J. (2023). Early warning systems in climate risk management. *Environmental Advances*, 17, 100322. <https://doi.org/10.1016/j.envadv.2023.100322>
- Kemhan. (2025). Pentingnya memahami seluk-beluk bencana hidrometeorologi di Indonesia. Kementerian Pertahanan Republik Indonesia. <https://www.kemhan.go.id/balitbang/2025/03/18/pentingnya-memahami-seluk-beluk-bencana-hidrometeorologi-di-indonesia.html>
- Ramadhan, A., & Putri, D. N. (2023). Penerapan model partisipatif dalam peningkatan kesiapsiagaan masyarakat terhadap bencana alam. *Jurnal Pengabdian Masyarakat Nusantara*, 5(1), 45–54.
- Sukmawan, A., Wibowo, R. P., & Nugroho, S. (2024). Critical communication of disaster preparedness areas for Indonesia. *International Journal of Disaster Risk Reduction*, 101, 104238. <https://doi.org/10.1016/j.ijdr.2024.104238>
- Sulastri, E., Nurjanah, S., & Fathoni, R. (2020). Pemberdayaan masyarakat berbasis partisipasi dalam mitigasi bencana di wilayah rawan longsor. *Jurnal Abdimas Lingkungan*, 4(2), 87–96. <https://doi.org/10.31002/jal.v4i2.2020>
- UNDRR. (2023). Limitations and challenges of early warning systems: Case study of 2018 Palu-Donggala. United Nations Office for Disaster Risk Reduction. https://www.preventionweb.net/files/68152_68152bukutsunamipaludonggalainggris.pdf
- Wijaya, D. P., & Sari, M. D. (2023). Enhancing early warning systems for disaster management in Indonesia. *RSIS Commentaries*, 44(2), 45–52. <https://rsis.edu.sg/blog/rsis/enhancing-early-warning-systems-for-disaster-management-in-indonesia>
- Wiyoko, T., Putra, R.E., Rois, M. (2020). Sosialisasi etika publikasi penulisan artikel ilmiah pada Guru Sekolah dasar di Dusun Bangun Harjo, *Jurnal Pengabdian Masyarakat*, Volume (1), 1-7, <https://ejournal.stkip-mmb.ac.id/indexphp/JPM>
- Yuliana, R., & Hartono, S. (2023). Pemanfaatan informasi cuaca dan iklim untuk mitigasi bencana di wilayah rawan longsor. *Jurnal Geosfer Indonesia*, 8(1), 75–88. <https://doi.org/10.19184/geosfer.v8i1.34529>