

Enhancing Flood Disaster Literacy and English Communication Skills through Bilingual Community-Based Training

Peningkatan Literasi Bencana Banjir dan Komunikasi Bahasa Inggris melalui Pelatihan Bilingual Berbasis Masyarakat

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Abstract

Communities in flood-prone areas of Indonesia continue to face increasing flood risk driven by land-use change, extreme rainfall, and rapid urbanization, while their disaster literacy and basic English communication skills for accessing emergency information remain limited. This community service program aimed to enhance participants' flood disaster literacy and basic English communication skills through a bilingual, community-based training approach. The program was implemented for senior high school students and youth in a flood-prone sub-district of Bandar Lampung, Lampung Province, through four stages: initial needs assessment, bilingual training (lectures, demonstration, group discussion, and simulation), flood preparedness simulation, and evaluation using pre-test and post-test instruments. Training materials integrated flood-related content-hazards, preparedness, evacuation, and emergency response-with corresponding English components, including disaster vocabulary, emergency expressions, and instruction-giving. Results showed an increase in participants' flood knowledge scores and English disaster-communication scores, together with an improved ability to determine and communicate appropriate action during flood events, as assessed through a practical performance task. Participants also reported greater confidence in using basic English expressions during simulated emergencies. These findings indicate that a bilingual approach integrating disaster education with functional English communication training is an effective and readily replicable model for strengthening community-based flood preparedness, and offers a novel contribution linking hydrology, disaster education, and English language education.

Keywords: flood disaster; disaster literacy; English communication; bilingual education; community service

Abstrak

Masyarakat di wilayah rawan banjir di Indonesia menghadapi risiko banjir yang terus meningkat akibat perubahan tata guna lahan, curah hujan ekstrem, dan urbanisasi yang cepat, sementara literasi kebencanaan dan kemampuan komunikasi bahasa Inggris dasar untuk mengakses informasi kedaruratan masih terbatas. Kegiatan pengabdian ini bertujuan meningkatkan literasi bencana banjir dan kemampuan komunikasi bahasa Inggris dasar peserta melalui pendekatan pelatihan bilingual berbasis masyarakat. Kegiatan dilaksanakan bagi siswa SMA/SMK dan pemuda di salah satu kelurahan rawan banjir Kota Bandar Lampung melalui empat tahap: asesmen kebutuhan awal, pelatihan bilingual (ceramah, demonstrasi, diskusi kelompok, dan simulasi), simulasi kesiapsiagaan banjir, serta evaluasi menggunakan pre-test dan post-test. Materi pelatihan memadukan konten kebencanaan banjir-bahaya, kesiapsiagaan, evakuasi, dan tanggap darurat-dengan komponen bahasa Inggris yang relevan, meliputi kosakata kebencanaan, ungkapan darurat, dan pemberian instruksi. Hasil kegiatan menunjukkan peningkatan skor pengetahuan banjir dan skor komunikasi bahasa Inggris kebencanaan, serta peningkatan kemampuan peserta dalam menentukan dan mengomunikasikan tindakan yang tepat saat banjir. Peserta juga melaporkan meningkatnya kepercayaan diri dalam menggunakan ungkapan bahasa Inggris dasar pada simulasi kedaruratan. Temuan ini menunjukkan bahwa pendekatan bilingual yang memadukan edukasi kebencanaan dengan pelatihan komunikasi bahasa Inggris fungsional merupakan model yang efektif dan mudah direplikasi untuk memperkuat kesiapsiagaan banjir berbasis masyarakat.

Kata kunci: bencana banjir; literasi kebencanaan; komunikasi bahasa Inggris; pendidikan bilingual; pengabdian masyarakat

1. INTRODUCTION

Flood is among the most frequent hydrometeorological disasters in Indonesia, and its risk continues to increase due to land-use change, extreme rainfall intensity, and rapid urbanization in watershed areas. Reduced infiltration capacity, sedimentation, and the conversion of catchment areas into settlements have accelerated surface runoff, while community disaster risk reduction education has not been implemented evenly across regions (Amri, Bird, Ronan, & Towers, 2017). Risk perception, media exposure, and personal experience have further been shown to shape household attitudes and behavioral control toward flood preparedness (Kurata, Ong, Ang, Angeles, Bornilla, & Fabia, 2023). Consequently, many communities in flood-prone areas still show low levels of preparedness and limited understanding of appropriate action before, during, and after a flood event.

Flood risk cannot be reduced solely through structural infrastructure such as embankments, drainage improvement, or retention basins. Community preparedness and disaster literacy are equally essential components of flood risk reduction, since the ability of residents to recognize hazard signs, interpret warning information, and take timely protective action largely determines the impact of a flood event on lives and property (Boonyaratkalin, Partiprajak, & Piaseu, 2020). Structured, participatory training-combining in-class instruction with field practice and simulation-has been shown to produce measurable gains in community knowledge and evacuation skill in Indonesian flood-prone settings (Subandi, Alim, Haryanti, & Prabandari, 2019).

In practice, community disaster education is often delivered in a single language and focuses primarily on technical knowledge, such as hazard maps, causes of flooding, and evacuation routes (Kamil, Utaya, Sumarmi, & Utomo, 2020). Meanwhile, disaster communication increasingly requires the ability to understand basic English terminology, particularly in educational, digital, and emergency-information contexts, where warning systems, humanitarian materials, and online references are frequently presented in English.

English is not merely an academic subject; it can also function as a practical tool for disaster communication. Basic English proficiency enables individuals to recognize disaster-related vocabulary, understand emergency instructions, read warning information from international sources, and communicate basic emergency needs to non-Indonesian-speaking responders or visitors. Uekusa and Matthewman (2023) argue that multilingual capacity within a community-including the ability of ordinary residents to translanguage-can itself function as a disaster risk reduction strategy, reducing the vulnerability created by language barriers during emergencies. This is illustrated by a Canadian community preparedness workshop in which a session delivered to a community whose members primarily spoke English as a second language required deliberate pedagogical adjustment to remain effective (Bogdan, Roszko, Beckie, & Conway, 2021). Within language education, drawing on learners' full linguistic repertoire rather than treating each language in isolation-known as translanguageing pedagogy-has been shown to deepen comprehension and strengthen learners' confidence in using a second language for real communicative purposes (Cummins, 2019). This is consistent with the principles of English for Specific Purposes, which centers language learning on learners' real communicative needs (Hutchinson & Waters, 1987).

The authors' prior community service activities have addressed flood-related community capacity building, including participatory hydrology training in Rawapitu, Tulang Bawang Regency (Putra, Fauziah, & Maini, 2025) and flood resilience empowerment in Kelurahan

Kangkung, Bandar Lampung (Putra, Syallaby, & Kurniawan, 2026), as well as environment-based clean water governance literacy in rural communities (Putra, Kurniawan, & Syallaby, 2026). Similar single-topic disaster education activities for school-age participants elsewhere in Indonesia, such as flood preparedness training for elementary school students in Banjarmasin (Trifianingsih, Sitompul, & Rahman, 2025), likewise report pre-test to post-test knowledge gains but remain confined to disaster content alone. These programs improved community flood knowledge but were delivered in Indonesian only. Community service programs that simultaneously integrate flood disaster literacy and basic English communication training therefore remain limited, despite the growing relevance of bilingual competence for disaster-information access.

This community service program aimed to enhance participants' flood disaster literacy and basic English communication skills through a bilingual, community-based training approach that combines hydrological disaster education with functional English instruction relevant to emergency communication.

2. METHODS

This program was implemented as a continuation of the authors' earlier flood-related community engagement in Lampung Province, which had identified recurrent flood exposure and limited structural flood mitigation capacity in several sub-watersheds, including Way Pisang (Putra, Alim, & Ulya, 2026) and Way Semangka (Putra, Mashuri, & Ulya, 2025). Building on these hydrological findings and on the community empowerment approach previously applied in Kelurahan Kangkung (Putra, Syallaby, & Kurniawan, 2026), the present program extended the model by integrating a bilingual education component.

2.1 Location and Participants

The program was conducted in a flood-prone sub-district (kelurahan) of Bandar Lampung, Lampung Province, involving 32 participants consisting of senior high/vocational school (SMA/SMK) students and local youth. Participants were purposively selected from the flood-affected neighborhood in coordination with the local sub-district office and school partners. This group was selected because pre-test/post-test instruments and simulation exercises could be readily administered, an English-language component could be meaningfully incorporated into the existing school curriculum, and program outcomes could be measured in a structured manner.

2.2 Community Service Approach

The program was implemented through four sequential stages: (1) initial needs assessment, to identify participants' baseline flood knowledge and English proficiency; (2) bilingual training, combining flood disaster education with basic English communication instruction; (3) flood preparedness simulation, in which participants practiced bilingual evacuation communication; and (4) evaluation, using pre-test/post-test instruments and a practical performance assessment. This framework is illustrated in Figure 1.

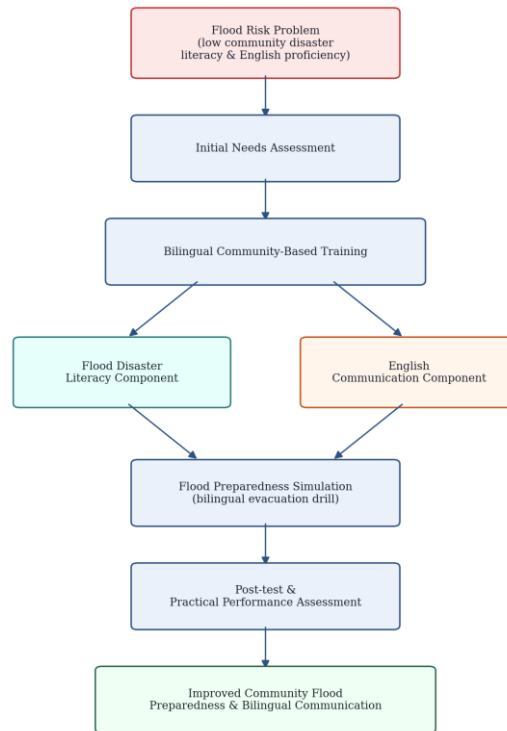


Figure 1. Bilingual Community-Based Flood Disaster Education Framework

Source: authors' design (2026)

2.3 Training Materials

Training materials were organized into five integrated modules, each combining a flood disaster component with a corresponding English-language component, as summarized in Table 1.

Module	Flood Component	English Component
1	Flood hazards	Flood-related vocabulary
2	Flood preparedness	Emergency expressions
3	Evacuation	Giving instructions
4	Emergency response	Disaster communication
5	Flood simulation	English emergency dialogue

Table 1. Training Modules Integrating Flood Disaster and English Components

Source: authors' design (2026)

2.4 Evaluation Method

Two instruments were used to evaluate program outcomes. First, a pre-test was administered before training and a post-test using an equivalent set of items was administered after training. Each test consisted of 20 items: 10 items assessing flood disaster literacy and 10 items assessing basic English disaster-communication ability. The percentage improvement in each indicator was calculated using the following formula:

$$\text{Improvement (\%)} = [(Post\text{-}test\ score - Pre\text{-}test\ score) / Pre\text{-}test\ score] \times 100$$

Second, a practical performance assessment was used to evaluate participants' applied competence: each participant was asked to identify a flood hazard, explain the associated risk, and

give an evacuation instruction in English. Performance was scored on a 1-4 rubric scale (1 = not able, 4 = able to perform the task fluently and accurately).

3. RESULTS AND DISCUSSION

3.1 Initial Condition of Participants

The needs assessment indicated that most participants had only a general awareness of flooding as a recurring seasonal event, with limited understanding of formal flood hazard classification, early-warning signs, or evacuation procedures. Their English proficiency was likewise limited to basic classroom vocabulary, and participants reported difficulty understanding disaster-related terms such as "evacuation," "embankment," or "emergency shelter." This baseline condition confirmed the two-fold problem underlying the program: limited flood disaster literacy and limited capacity to communicate about disaster situations in English.

3.2 Implementation of Bilingual Training

The training combined disaster education with practical English communication activities delivered through lectures, demonstration, group discussion, and simulation. Participants were introduced to flood-related terminology, emergency expressions, evacuation instructions, and basic disaster communication patterns, applied directly to conditions in their own neighborhood. Group discussions and role-play activities were used to practice giving and following bilingual emergency instructions, while the flood preparedness simulation required participants to combine both competencies under a realistic evacuation scenario.

3.3 Improvement in Flood Disaster Literacy

Comparison of pre-test and post-test scores (Table 2) indicated an increase across all flood-related indicators, including knowledge of flood hazards, preparedness measures, and emergency response procedures. This improvement is consistent with prior evidence that structured, activity-based disaster training-rather than passive information delivery-is associated with measurable gains in community disaster knowledge (Kamil et al., 2020; Boonyaratkalin et al., 2020), including comparable pre-test to post-test gains reported for a local-wisdom-based flood preparedness programme in Jambi (Subandi et al., 2019) and for school-based flood disaster education in Banjarmasin (Trifianingsih et al., 2025). The gain observed here is also consistent with the improvement previously recorded following participatory hydrology training in Rawapitu (Putra, Fauziah, & Maini, 2025), suggesting that structured, hands-on training formats are broadly effective for community flood education in this region. Risk perception and prior exposure to disaster information have likewise been shown to strengthen households' attitude toward preparedness behavior (Kurata et al., 2023), which may partly explain why participants with some prior flood experience engaged more readily with the training content.

Indicator	Pre-test	Post-test
Flood hazard knowledge	xx.x	xx.x
Flood preparedness	xx.x	xx.x
Emergency response	xx.x	xx.x
English disaster vocabulary	xx.x	xx.x
English emergency expressions	xx.x	xx.x
Practical performance (scale 1-4)	xx.x	xx.x

Table 2. Comparison of Pre-test and Post-test Scores

Source: program evaluation data (2026)

Note: The pre-test/post-test figures reported in Table 2 are placeholders (marked "xx.x") to be completed by the authors using the actual scores obtained from program participants before this manuscript is submitted; they should not be published as real findings until verified against field data.

3.4 Improvement in English Communication

Participants also showed improvement in English disaster-vocabulary and emergency-expression scores (Table 2), together with a higher average score on the practical performance task, which required participants to identify a hazard, explain its risk, and deliver an evacuation instruction in English. Observed gains included expanded disaster-related vocabulary, more accurate construction of simple emergency sentences, improved ability to deliver short instructions, and greater confidence in speaking English during the simulation. This pattern supports the argument that targeted, purpose-specific English instruction-focused on a concrete communicative need rather than general grammar-can produce functional gains within a short training period (Hutchinson & Waters, 1987), and reinforces the view that community-level multilingual capacity can meaningfully reduce disaster-communication barriers (Uekusa & Matthewman, 2023). Allowing participants to draw on both Indonesian and English during discussion, rather than requiring English-only responses, appeared to ease comprehension and encourage participation, consistent with the broader argument that leveraging learners' full linguistic repertoire strengthens engagement with a second language (Cummins, 2019). The trainers also found it useful to slow down instructions and check comprehension explicitly, a pedagogical adjustment similar to that reported for a mixed-proficiency community workshop in Canada (Bogdan et al., 2021).

3.5 Community Response and Sustainability

Participants and school partners responded positively to the bilingual format, noting that combining the two subjects made the material feel more relevant and less repetitive than single-topic disaster training. For sustainability, the training modules and simulation script have been made available to the partner school to be reused in extracurricular or mitigation-related activities, and local youth who performed well in the practical assessment were identified as potential peer facilitators for future sessions, consistent with the replicable, community-based model demonstrated in the authors' earlier programs in Kelurahan Kangkung (Putra, Syallaby, & Kurniawan, 2026) and in rural clean-water literacy training (Putra, Kurniawan, & Syallaby, 2026).

4. CONCLUSION

Based on the implementation and evaluation of this bilingual community-based training program, the following conclusions can be drawn:

1. Bilingual training increased participants' understanding of flood hazards, preparedness measures, and emergency response procedures, as reflected in pre-test to post-test gains in flood literacy scores.
2. Participants demonstrated an improved ability to use basic English terminology and emergency expressions, including identifying hazards, explaining risk, and giving evacuation instructions in English.
3. The integration of disaster education and English communication training offers a replicable model for community-based flood preparedness programs, particularly for

school-age youth in flood-prone areas, and provides a novel contribution linking hydrology, disaster education, and English language education.

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REFERENCES

- Amri, A., Bird, D. K., Ronan, K., & Towers, B. (2017). Disaster risk reduction education in Indonesia: Challenges and recommendations for scaling up. *Natural Hazards and Earth System Sciences*, 17(4), 595-612.
- Bogdan, E. A., Roszko, A. M., Beckie, M. A., & Conway, A. (2021). We're ready! Effectiveness of community disaster preparedness workshops across different community groups in Alberta, Canada. *International Journal of Disaster Risk Reduction*, 55, 102060.
- Boonyaratkalin, P., Partiprajak, S., & Piaseu, N. (2020). Flood preparedness literacy and behaviors in community-dwelling older adults. *Disaster Medicine and Public Health Preparedness*, 15(4), 452-457.
- Cummins, J. (2019). The emergence of translanguaging pedagogy: A dialogue between theory and practice. *Journal of Multilingual Education Research*, 9, Article 13.
- Hutchinson, T., & Waters, A. (1987). *English for specific purposes: A learning-centred approach*. Cambridge University Press.
- Kamil, P. A., Utaya, S., Sumarmi, & Utomo, D. H. (2020). Improving disaster knowledge within high school students through geographic literacy. *International Journal of Disaster Risk Reduction*, 43, 101411.
- Kurata, Y. B., Ong, A. K. S., Ang, R. Y. B., Angeles, J. K. F., Bornilla, B. D. C., & Fabia, J. L. P. (2023). Factors affecting flood disaster preparedness and mitigation in flood-prone areas in the Philippines: An integration of Protection Motivation Theory and Theory of Planned Behavior. *Sustainability*, 15(8), 6657.
- Putra, M. H. S., Alim, Z., & Ulya, M. R. (2026). Hidrologi forensik terhadap peristiwa banjir ekstrem di Sub DAS Way Pisang, Kabupaten Way Kanan. *CIVeng: Jurnal Teknik Sipil dan Lingkungan*, 7(1), 55-60.
- Putra, M. H. S., Fauziah, S. N., & Maini, M. (2025). Peningkatan kapasitas masyarakat dalam mitigasi risiko banjir melalui pelatihan hidrologi partisipatif di Desa Rawapitu, Kabupaten Tulang Bawang. *Jurnal Wiyata Madani*, 2(2), 20-28.
- Putra, M. H. S., Kurniawan, K. A., & Syallaby, M. (2026). Peningkatan literasi tata kelola air bersih berbasis geografi lingkungan pada masyarakat perdesaan. *Journal of Community Empowerment and Social Transformation*, 1(1), 17-27.
- Putra, M. H. S., Mashuri, M., & Ulya, M. R. (2025). Pendekatan hidrologi forensik untuk analisis penyebab dan dampak banjir di Daerah Aliran Sungai (DAS) Way Semangka, Lampung. *REKAYASA: Jurnal Ilmiah Fakultas Teknik Universitas Lampung*, 29(3).
- Putra, M. H. S., Syallaby, M., & Kurniawan, K. A. (2026). Pemberdayaan masyarakat untuk ketahanan banjir perkotaan di Kelurahan Kangkung. *Jurnal Wiyata Madani*, 3(1), 1-7.
- Putra, H. W. S., & Putra, M. H. S. (2026). Integrated water management and integrated agricultural water management design for smart and climate-resilient agriculture systems. *BIO Web of Conferences*, 246, 00023.

- Subandi, A., Alim, S., Haryanti, F., & Prabandari, Y. S. (2019). Training on modified model of programme for enhancement of emergency response flood preparedness based on the local wisdom of Jambi community. *Jàmbá: Journal of Disaster Risk Studies*, 11(1), e1-e9.
- Trifianingsih, D., Sitompul, D. R., & Rahman, A. (2025). Edukasi kebencanaan dalam meningkatkan kesiapsiagaan bencana banjir pada siswa sekolah dasar. *PengabdianMu: Jurnal Ilmiah Pengabdian kepada Masyarakat*, 10(9), 2050-2057.
- Uekusa, S., & Matthewman, S. (2023). Preparing multilingual disaster communication for the crises of tomorrow: A conceptual discussion. *International Journal of Disaster Risk Reduction*, 87, 103589.