KONEKTIVITAS: Journal of Community Service
Volume 2, Issue 2, 109-118
e-ISSN: 3110-1364 p-ISSN: 3110-1372
https://ejournalvidyasubhaga.com/index.php/KONEKTIVITAS
DOI: 10.65818/konektivitas.v2i2.320

Community Drainage Maintenance and Environmental Health Education in Pekutan Village

Lutfi Maulana[1]*, Erick Burhaein[2]
[1,2]Universitas Ma'arif Nahdlatul Ulama Kebumen, Indonesia

Article Info

Article history:

Received : Agust 27,2026
Revised : September 13,2026
Accepted : October 02,2026

Keywords:

community participation;
drainage maintenance;
environmental health;
health education
village governance.

abstract

Background of study: Blocked neighborhood drains can undermine environmental hygiene, while maintenance requires both resident involvement and technical support.

Aims and scope of paper: This community service initiative documented drainage problems, delivered practical environmental health education, and developed locally relevant maintenance recommendations in Pekutan Village, Indonesia.

Methods: The activity on 15 August 2026 combined coordination with village representatives, a participatory site inspection, drainage cleaning, an educational session, discussion, and a post-activity questionnaire. Observations and photographs were described narratively, alongside the reported questionnaire percentages.

Result: The activity identified waste, sediment, vegetation, and suspected channel-gradient problems. Cleaning and education were documented. The reported questionnaire distribution placed 85% in the understand or highly understand categories for drainage and 60% for environment-related diseases. Unreconciled attendance and response totals, unavailable item-level records, and the absence of a baseline limit interpretation of these percentages.

Conclusion: The initiative connected visible drainage problems with practical maintenance education and distinguished routine community tasks from issues requiring engineering review. It provides an implementation example and a basis for follow-up, without establishing gains in knowledge, hydraulic performance, or disease prevention.

To cite: Maula, L., & Burhaein, E. (2026). Community drainage maintenance and environmental health education in Pekutan Village. KONEKTIVITAS: Journal of Community Service, 2(2), 109-118 https://doi.org/10.65818/konektivitas.v2i2.320

This article is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License © 2026 by the authors.

INTODUCTION

Neighborhood drainage links the condition of shared infrastructure to everyday environmental hygiene. Waste and sediment can obstruct runoff pathways, yet a drain that appears cleaner after communal work has not necessarily regained adequate hydraulic capacity. A systematic review of pluvial flooding identifies drainage, land development, topography, waste, and management as interacting influences rather than a single cause (Singh et al., 2023). This distinction matters for village service programs, where readily visible blockages may coexist with construction or network problems that residents cannot resolve through cleaning alone.

***Corresponding author:**
Lutfi Maulana, Universitas Ma'arif Nahdlatul Ulama Kebumen, Indonesia. ✉ lutfimaula2@gmail.com

The health rationale also requires precision. Flood exposure is associated with several adverse health outcomes, although risks differ across diseases and settings (Yang et al., 2024). Dengue transmission involves infected Aedes mosquitoes and depends on suitable breeding habitats, human exposure, and local transmission conditions (World Health Organization [WHO], 2025). The presence of a blocked drain therefore indicates an environmental management concern; it does not establish mosquito species, pathogen contamination, or a disease burden in the surrounding population.

Recent reviews support environmental management as part of integrated dengue control, while distinguishing changes in vector indices from changes in human disease (Mahmud et al., 2023; Tortosa-La Osa et al., 2022). The WHO response plan for dengue and other Aedes-borne arboviruses similarly places community protection alongside surveillance, coordination, care, and access to countermeasures (WHO, 2024). Drainage education is most useful when it explains practical actions and their limits, rather than promising that a single cleanup will prevent infection.

These concerns intersect with global commitments to health, water and sanitation, and sustainable settlements under SDGs 3, 6, and 11 (United Nations, 2025). The WHO and UNICEF monitoring report emphasizes inequalities in household water, sanitation, and hygiene services, reinforcing the need to consider local service conditions rather than infrastructure in isolation (WHO & United Nations Children's Fund [UNICEF], 2025). Waste prevention and reliable collection are also relevant because removing refuse from a drain does not solve the problem if it is subsequently deposited elsewhere in the drainage network (United Nations Environment Programme [UNEP] & International Solid Waste Association [ISWA], 2024).

In Indonesia, the 2025–2029 National Medium-Term Development Plan provides the policy setting for the Asta Cita development priorities, including development from villages and strengthened basic services (Republic of Indonesia, 2025). The Ministry of Public Works connects settlement improvement with drainage normalization and environmental quality (Ministry of Public Works, 2025). The Ministry of Health also recommends continuing community mobilization, household source reduction, and repair of water channels within dengue prevention efforts (Ministry of Health, 2024). These policies provide a rationale for local action; they are not evidence that a particular activity has achieved national targets.

Community involvement can connect residents' experience of recurrent problems with technical decision-making. Work on community-led sustainable drainage highlights the value of meaningful participation beyond initial consultation (Starkey et al., 2025), while research in North Jakarta demonstrates the relevance of local knowledge to flood adaptation planning (Prana et al., 2024). Differences between community and practitioner perspectives further suggest that shared inspection and discussion should precede decisions about interventions (Morris & Tippett, 2024). These insights are relevant to Pekutan without implying that approaches developed in other settlements can be transferred unchanged.

The practical need in Pekutan Village, Bayan Subdistrict, Purworejo Regency, Central Java, was to connect observed channel obstructions with maintenance education and a route for escalating technical concerns. This article describes a community service initiative that combined site inspection, communal cleaning, environmental health education, discussion, and a post-activity questionnaire. Its objectives were to document drainage concerns, explain maintenance and environmental health messages, summarize the reported educational response, and formulate feasible follow-up recommendations. The contribution is an account of implementation and its evidential limits, rather than a controlled assessment of effectiveness.

METHOD

Service design and setting

The initiative used a participatory community service design in Pekutan Village on Saturday, 15 August 2026. The sequence involved preparation, implementation, and immediate evaluation. Activities drew on participatory problem identification and community discussion, principles associated with participatory rural appraisal and community-based approaches. The documented procedures do not establish a complete community-based research cycle, formal co-analysis, or a

qualitative interview study. Accordingly, the report is presented as a descriptive service account with an aggregate post-activity evaluation.

Participants and community roles

Residents, village officials, and representatives of the village youth organization took part. Coordination with village representatives determined the activity arrangements. The activity records report 25 attendees, but participation and evaluation totals differ across records. The questionnaire denominator remains unverified. Neither a population sampling frame nor demographic characteristics are documented. The participants are therefore treated as the service group involved in the activity, rather than a representative sample of Pekutan residents.

Implementation procedudes

Preparation involved coordination with the village government, an initial inspection of drainage conditions, and preparation of educational materials and cleaning equipment. During implementation, the team and community members inspected neighborhood channels and undertook cleaning. The inspection focused on visible waste, sediment, vegetation, and concerns about the channels' physical configuration. Issues beyond routine maintenance were recorded for recommendations to the responsible authorities. No reconstruction or surveyed correction of channel gradients was reported.

The educational session addressed drainage functions, common maintenance problems, and environment-related health risks. It was followed by discussion in which participants described local drainage concerns and maintenance practices. A questionnaire was completed after the session. The photographs document the site inspection, cleaning, educational meeting, discussion, and questionnaire completion. They show the conduct of activities, but cannot independently establish attendance totals, learning gains, changes in flow, or adoption of maintenance habits.

Documentation and evalution measures

Evidence comprised the descriptive activity account, five activity photographs, and an aggregate table of questionnaire responses. The questionnaire covered understanding of environmental drainage and environment-related diseases. Results were grouped into moderately understand, understand, and highly understand categories. Although the activity description refers to comprehension or multiple-choice questions, the exact items, response format, scoring key, category thresholds, and psychometric evidence are not available. The categories are therefore reported as labeled, without interpreting them as a validated knowledge score.

Analysis and reporting scope

Observational information was organized into drainage concerns, activity delivery, educational response, and follow-up needs. This was descriptive synthesis, not transcript-based thematic analysis. The questionnaire percentages were reproduced from the aggregate table. The combined understand and highly understand figures were calculated by adding the two reported categories; raw counts, confidence intervals, and significance tests were not reconstructed. Without baseline assessment or a comparison group, the evaluation cannot estimate improvement attributable to the activity.

The report concerns infrastructure observations and educational activities rather than clinical examination. No identifiable individual questionnaire responses are presented. The evaluation was limited to aggregate educational categories and activity documentation; it did not include health surveillance.

RESULTS AND DISCUSSION

Drainage concerns and activities delivered

The inspection identified four recurring concerns: waste in channels, accumulated sediment, vegetation encroachment, and suspected problems with channel gradients or structural configuration. The last concern was based on field observation rather than a level survey, hydraulic calculation, or comparison against a specified design standard. It should consequently be treated as a request for technical assessment. Table 1 distinguishes the observations from the actions that can reasonably follow them.

Table 1. Observed drainage concerns and appropriate follow-up

Concern	Documented response	Follow-up needed
Waste and debris	Communal drainage cleaning	Prevent re-entry of waste and arrange collection and disposal.
Sediment accumulation	Identified during inspection and cleaning	Record recurrent deposits and assess whether further removal is safe.
Vegetation encroachment	Identified as an obstruction concern	Arrange selective maintenance with safe access to channels.
Suspected gradient or structural problems	Not reconstructed during the activity	Request a surveyed engineering inspection before proposing redesign.

The inspection and cleanup photographs provide evidence of people working along an open neighborhood channel (Figure 1). They support the description of an activity delivered in a residential setting. However, there is no standardized before-and-after photographic series, measured volume of material removed, mapped channel length, discharge observation, or rainfall record. The activity therefore cannot be described as having demonstrated a reduction in flooding or restoration of drainage capacity.



Figure 1. Site inspection (left) and community drainage cleaning (right) in Pekutan Village. Source: activity documentation.

The combination of waste, sediment, and a possible structural issue is consistent with a maintenance problem that may have several causes. Singh et al. (2023) show why obstruction should be interpreted alongside wider drainage and catchment conditions. Sweetapple et al. (2023) further identify implementation barriers in stormwater management, suggesting that an appropriate next step is reliable observation and responsibility allocation before investment in more complex

monitoring. For Pekutan, an accessible location register would be more defensible than an unmeasured claim that channel gradients fail technical standards.

Education, discussion, and immediate questionnaire response

The meeting linked the drainage conditions discussed during inspection with explanations of channel maintenance and environmental health. Participants were invited to describe problems and existing practices. Figure 2 records the educational meeting, discussion, and questionnaire completion. This format created an opportunity to relate technical language to a familiar neighborhood setting. It does not, by itself, show that messages were retained or acted upon after the event.



Figure 2. Environmental health education (left), discussion of drainage concerns (center), and questionnaire completion (right). Source: activity documentation.

The reported distribution was more favorable for drainage understanding than for environment-related diseases. Specifically, 55% and 30% were labeled understand and highly understand for drainage, compared with 50% and 10% for diseases. This pattern may help identify material for reinforcement, but the two topics cannot be compared as equivalent validated scales. The 85% and 60% summaries describe the reported distribution only. They do not show that knowledge increased by these percentages or that the activity was effective.

Table 2. Reported distribution of post-activity understanding categories

Reported categoty	Environmental drainage (%)	Environment-related diseases (%)
Moderately understand	15	40
Understand	55	50
Highly understand	30	10
Understand plus highly understand	85	60

Note. The last row sums the two higher categories and is not an additional response category. Percentages are reproduced from the activity's aggregate table; the number of respondents, scoring rules, and item-level responses were not verified. Counts and learning gains cannot be inferred.

The reported distribution was more favorable for drainage understanding than for environment-related diseases. Specifically, 55% and 30% were labeled understand and highly understand for drainage, compared with 50% and 10% for diseases. This pattern may help identify material for reinforcement, but the two topics cannot be compared as equivalent validated scales. The 85% and 60% summaries describe the reported distribution only. They do not show that knowledge increased by these percentages or that the activity was effective.

Measurement quality is central to interpreting community engagement. Gordon et al. (2023) identify limitations in the development and implementation of engagement measurement scales, while Lloyd et al. (2023) emphasize that evaluation should reflect the purpose and context of involvement. In Pekutan, future educational evaluation should distinguish objectively scored

comprehension from self-rated confidence and participation satisfaction. A short baseline and follow-up using the same clearly defined items would support a more informative assessment than the present post-activity categories.

Environmental health interpretation

The relevant health message is to reduce avoidable exposure opportunities through coordinated environmental management. Mahmud et al. (2023) and Tortosa-La Osa et al. (2022) support the inclusion of environmental measures in vector control, but their findings cannot be transferred as an effect estimate for this activity. No larvae were sampled, mosquito species identified, water samples tested, or disease cases followed in Pekutan. Aedes-related risk also involves water-holding containers around homes, so inspection of neighborhood drains should complement household source reduction rather than substitute for it (WHO, 2025).

Likewise, broader associations between flooding and illness do not establish that the inspected channel caused diarrhea, leptospirosis, malaria, or any other local disease (Yang et al., 2024). Educational delivery should explain relevant transmission routes and avoid treating all standing water as an identical hazard. Continued advice should be coordinated with the local health service and consistent with the Ministry of Health's community mobilization guidance (Ministry of Health, 2024). The present activity is an environmental health education effort, not evidence of disease prevention.

Implications

The clearest practical implication is the need to assign different responsibilities to routine maintenance and technical assessment. Research in flood risk governance identifies opportunities for resident-generated information to support professional decision-making (Marchezini et al., 2022), while analysis of community engagement cautions that responsibilities need adequate institutional support (Puzyreva et al., 2022). In Pekutan, residents can help identify recurrent obstruction and communicate observations, but structural assessment, safe maintenance procedures, and any redesign require appropriate technical authority and resources.

A standing reporting route would also reduce the possibility that community concerns are repeatedly acknowledged without resolution. Studies of flood planning and policy implementation emphasize the consequences of weak communication and reactive engagement (Hart et al., 2024; Henderson et al., 2025). Community participation should therefore include a visible response to reported problems. Nickel and Hunt (2024) additionally highlight the importance of resource distribution and equitable engagement; a maintenance schedule should account for who has the time, capacity, and safe access to participate.

Drainage maintenance also depends on waste services beyond the event itself. A study of polycentric waste governance shows the importance of interactions between residents, community managers, and other actors (Hao et al., 2023), while work in Jakarta examines public preferences concerning adaptive waste services (Suryawan & Lee, 2023). For Pekutan, these studies support investigating feasible collection and disposal arrangements. They do not establish local willingness to pay or justify assuming that volunteer labor alone will sustain the service.

Contribution of community service

The initiative brought infrastructure inspection, hands-on cleaning, and health education into one local service sequence. It made a useful operational distinction between visible obstructions that can be addressed through maintenance and suspected structural concerns requiring referral. Place-based engagement literature supports attending to local conditions and barriers (Rong et al., 2023), while community-led drainage work emphasizes participation throughout the life of an intervention (Starkey et al., 2025). The Pekutan experience offers a practical starting point for that continuing involvement, without demonstrating that long-term community governance has already been established.

Limitations

The report describes one activity in one village. Attendance and questionnaire response totals are inconsistent, the questionnaire has no documented scoring or validation, and respondent-level records are unavailable. The aggregate percentages cannot be independently recalculated or generalized to the village population. There was no baseline, comparison group, delayed follow-up, systematic interview dataset, or quantified assessment of channel performance. Photographs document participation but cannot establish behavior change, flow improvement, or health outcomes.

Suggestions

Follow-up should first reconcile attendance and questionnaire records, retain the original items and scoring key, and document the locations inspected. The village government and relevant technical service can then determine whether surveyed channel levels, downstream restrictions, or repairs require attention. Table 3 presents proposed actions rather than activities already completed or agreements already adopted.

Table 3. Proposed follow-up actions and records for accountability

Proposed action	Suggested responsible parties	Evidence to retain
Reconcile the activity evaluation	Activity team and village contact	Verified attendance, response total, original questionnaire, and scoring rules.
Plan routine inspection and safe cleaning	Village officials, residents, and youth representatives	Agreed schedule, location log, disposal arrangements, and completed tasks.
Assess recurrent ponding or suspected structural problems	Village government and competent technical service	Surveyed levels, inspection findings, and a response to the referral.
Reinforce household prevention messages	Local health service and community representatives	Education materials and a documented follow-up discussion.
Evaluate continuity	Activity team and village representatives	Repeat observations at the same locations and a defined learning reassessment.

These proposals are compatible with village-oriented development and settlement improvement priorities, but implementation requires local agreement and resources (Ministry of Public Works, 2025; Republic of Indonesia, 2025). Progress should be reported through specific local indicators, such as resolved obstruction reports and completed technical referrals. Such indicators would demonstrate implementation more clearly than broad claims of having achieved the SDGs or reduced disease incidence.

CONCLUSION

The community service initiative in Pekutan Village documented waste, sediment, vegetation, and suspected structural concerns in neighborhood drainage, and combined communal cleaning with environmental health education and discussion. The reported questionnaire distribution was favorable for drainage understanding relative to disease-related material, but inconsistent totals and limited evaluation records prevent conclusions about learning gains. The activity's defensible contribution is a locally grounded service process and a set of follow-up priorities. Continuing maintenance, safe waste disposal, technical assessment of recurrent problems, and verified evaluation records are needed before claims about durable behavior change, hydraulic improvement, or disease prevention can be assessed.

ACKNOWLEDGMENT

The authors thank the Pekutan Village Government, participating residents, village youth representatives, and Universitas Ma'arif Nahdlatul Ulama Kebumen for their contributions to the preparation, implementation, and documentation of the community service activity.

AUTHOR CONTRIBUTION STATEMENT

LM planned the activity, prepared the educational materials, and implemented the community service activities. EB supervised the activities.

AI DISCLOSURE STATEMENT

ChatGPT (OpenAI) assisted with English-language revision, manuscript organization, and reference discovery during manuscript preparation. Responsibility for checking the factual accuracy, references, interpretation, publication permissions, and final manuscript rests with the authors.

REFERENCES

Gordon, B., Van De Griend, K. M., Scharp, V. L., Ellis, H., & Nies, M. A. (2023). Community engagement in research: An updated systematic review of quantitative engagement measurement scales for health studies. *Evaluation & the Health Professions, 46*(4), 291–308. https://doi.org/10.1177/01632787231203346

Hao, X., Dong, L., Liu, G., & Zhang, X. (2023). Polycentric governance in waste management: A mechanism analysis of actors' behavior evolution at the community level. *Resources, Conservation and Recycling, 191*, Article 106879. https://doi.org/10.1016/j.resconrec.2023.106879

Hart, N., Anderson, K. F., & Rifai, H. (2024). "Not enough": A qualitative analysis of community perceptions of neighborhood government flood management plans using the case of Houston, Texas. *International Journal of Disaster Risk Reduction, 104*, Article 104354. https://doi.org/10.1016/j.ijdrr.2024.104354

Henderson, F., Bennett, B., Dohain-Lesueur, R., & Helwig, K. (2025). "It's not really their problem": Reactive institutional community engagement and flood policy implementation. *International Journal of Disaster Risk Reduction, 116*, Article 105096. https://doi.org/10.1016/j.ijdrr.2024.105096

Lloyd, N., Hyett, N., & Kenny, A. (2023). Barriers and enablers to evaluating outcomes from public involvement in health service design: An interpretive description. *Qualitative Health Research, 33*(11), 983–994. https://doi.org/10.1177/10497323231191048

Mahmud, M. A. F., Abdul Mutalip, M. H., Lodz, N. A., Muhammad, E. N., Yoep, N., Hasim, M. H., Abdul Rahim, F. A., Aik, J., Rajarethinam, J., & Muhamad, N. A. (2023). The application of environmental management methods in combating dengue: A systematic review. *International Journal of Environmental Health Research, 33*(11), 1148–1167. https://doi.org/10.1080/09603123.2022.2076815

Marchezini, V., Porto de Albuquerque, J., Pitidis, V., Rudorff, C. d. M., Lima-Silva, F., Klonner, C., & Martins, M. H. d. M. (2022). Flood risk governance in Brazil and the UK: Facilitating knowledge exchange through research gaps and the potential of citizen-generated data. *Disaster Prevention and Management: An International Journal, 31*(6), 30–44. https://doi.org/10.1108/dpm-01-2022-0016

Ministry of Health. (2024, November 14). *Waspada penyakit di musim hujan [Disease vigilance during the rainy season].* https://kemkes.go.id/id/waspada-penyakit-di-musim-hujan

Ministry of Public Works. (2025). *Dukung Asta Cita, Kementerian PU perkuat penataan kawasan permukiman tahun 2025 [Supporting Asta Cita through settlement improvement in 2025].* https://sahabat.pu.go.id/eppid/berita/detail/dukung-asta-cita-kementerian-pu-perkuat-penataan-kawasan-permukiman-tahun-2025

Morris, S. A., & Tippett, J. (2024). Perceptions and practice in natural flood management: Unpacking differences in community and practitioner perspectives. *Journal of Environmental Planning and Management, 67*(11), 2528–2552. https://doi.org/10.1080/09640568.2023.2192861

Nickel, P. M., & Hunt, C. (2024). Community engagement, equity, and cross-sector public health practice. *Public Health Reports, 139*(6), 669–674. https://doi.org/10.1177/00333549241249671

Prana, A. M., Curl, A., Dionisio, M. R., Gomez, C., Hart, D., Apriyanto, H., & Prasetya, H. (2024). Urban planning approaches to support community-based flood adaptation in North Jakarta kampungs. *Disaster Prevention and Management: An International Journal, 33*(4), 383–405. https://doi.org/10.1108/dpm-05-2023-0114

Puzyreva, K., Henning, Z., Schelwald, R., Rassman, H., Borgnino, E., de Beus, P., Casartelli, S., & Leon, D. (2022). Professionalization of community engagement in flood risk management: Insights from four European countries. *International Journal of Disaster Risk Reduction, 71*, Article 102811. https://doi.org/10.1016/j.ijdrr.2022.102811

Republic of Indonesia. (2025). *Peraturan Presiden Republik Indonesia Nomor 12 Tahun 2025 tentang Rencana Pembangunan Jangka Menengah Nasional Tahun 2025–2029 [Presidential Regulation Number 12 of 2025 on the National Medium-Term Development Plan 2025–2029].* https://jdih.kemenkoinfra.go.id/perpres-no-12-tahun-2025

Rong, T., Ristevski, E., & Carroll, M. (2023). Exploring community engagement in place-based approaches in areas of poor health and disadvantage: A scoping review. *Health & Place, 81*, Article 103026. https://doi.org/10.1016/j.healthplace.2023.103026

Singh, H., Nielsen, M., & Greatrex, H. (2023). Causes, impacts, and mitigation strategies of urban pluvial floods in India: A systematic review. *International Journal of Disaster Risk Reduction, 93*, Article 103751. https://doi.org/10.1016/j.ijdrr.2023.103751

Starkey, E., Rollason, E., Cotterill, S., Sreenivas, P., & Bracken, L. (2025). Maximising urban resilience using sustainable drainage systems (SuDS): Making the case for community-led urban water management. *Land Use Policy, 158*, Article 107732. https://doi.org/10.1016/j.landusepol.2025.107732

Suryawan, I. W. K., & Lee, C.-H. (2023). Citizens' willingness to pay for adaptive municipal solid waste management services in Jakarta, Indonesia. *Sustainable Cities and Society, 97*, Article 104765. https://doi.org/10.1016/j.scs.2023.104765

Sweetapple, C., Webber, J., Hastings, A., & Melville-Shreeve, P. (2023). Realising smarter stormwater management: A review of the barriers and a roadmap for real world application. *Water Research, 244*, Article 120505. https://doi.org/10.1016/j.watres.2023.120505

Tortosa-La Osa, S., Martín-Ruiz, E., Galán-Relaño, Á., & de Labry-Lima, A. O. (2022). Effectiveness of environmental interventions to reduce entomological indices of dengue, Zika, and chikungunya vector. *Acta Tropica, 233*, Article 106523. https://doi.org/10.1016/j.actatropica.2022.106523

United Nations. (2025). *The Sustainable Development Goals report 2025.* https://unstats.un.org/sdgs/report/2025/

United Nations Environment Programme, & International Solid Waste Association. (2024). *Global waste management outlook 2024: Beyond an age of waste—Turning rubbish into a resource.* https://www.unep.org/en/publications/report/global-waste-management-outlook-2024

World Health Organization. (2024). *Global strategic preparedness, readiness and response plan for dengue and other Aedes-borne arboviruses: September 2024–September 2025.* https://www.who.int/publications/m/item/global-strategic-preparedness--readiness-and-response-plan-for-dengue-and-other-aedes-borne-arboviruses

World Health Organization. (2025, August 21). *Dengue.* https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue

World Health Organization, & United Nations Children's Fund. (2025). *Progress on household drinking water, sanitation and hygiene 2000–2024: Special focus on inequalities.* https://data.unicef.org/wp-content/uploads/2025/09/jmp-2025-wash-households-launch.pdf

Yang, Z., Huang, W., McKenzie, J. E., Yu, P., Ju, K., Wu, Y., Wen, B., Guo, Y., & Li, S. (2024). Mortality and morbidity risks associated with floods: A systematic review and meta-analysis.

Environmental Research, 263, Article 120263. https://doi.org/10.1016/j.envres.2024.120263