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ANALYSIS OF COMMUNITY AWARENESS IN MANAGING ORGANIC WASTE AS A SOLUTION TO OVERCOME FLOOD DISASTERS

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ABSTRACT

This research is motivated by the frequent flooding in Laden Village, Pamekasan Regency, caused by a combination of factors: high rainfall, influx from other areas, and reduced water catchment areas due to dense settlements. The purpose of this study is to describe the conditions, causes, and impacts of flooding, as well as community and government efforts to mitigate them. This study employed descriptive qualitative research using questionnaires, interviews, and field observation methods. The study population included all residents living in the flood-prone area of Laden Village, Dusun Timur. The sample consisted of 10 purposively selected respondents, including affected residents and village officials in the flood-affected area. Field observations were conducted on September 27, 2025. Impacts experienced by the community included house damage, disruption to community activities, and an increased risk of environmental diseases. Our proposed mitigation effort involves promoting organic waste processing following the government's river dredging. The observations emphasize the importance of environmental management and spatial planning to reduce the risk of future flooding.

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Introduction

The village of Laden in Pamekasan is known as one of the areas most prone to flooding when the rainy season arrives (Anwari & Makruf, 2019). This condition is not only influenced by high rainfall and the geographical location of the area, but also by the habit of the community who still dispose of waste indiscriminately into rivers and drainage channels (Sugeng, Jumiati, & Desmaiani, 2025). Household waste, market waste, and inorganic materials such as plastic often settle and clog waterways, drastically reducing drainage capacity (Khufat, Warnidasari, & Firdaus, 2024) . As a result, water cannot flow optimally and overflows into residential areas, causing flooding that disrupts residents' activities and damages the surrounding environment (Ilham, Beatrick, & Simbiak, 2025).

Flooding is one of the most common natural disasters in various regions of Indonesia and has a major impact on people's lives. This phenomenon is generally caused by high and prolonged rainfall, limited drainage capacity, and certain natural conditions such as low-lying areas that are prone to flooding. The combination of these factors makes many areas prone to flooding, so that this event not only causes damage to infrastructure and hinders economic activity, but also increases public awareness of the potential for subsequent flooding. This situation highlights the importance of mitigation and early detection efforts to minimize the risk of losses that may arise from flooding (Faiza, Gunawan, & Andriani, 2022).

Floods caused by waste and environmental pollution have various adverse effects on communities and ecosystems (Karim, 2024). In addition to causing damage to infrastructure and hampering residents' economic activities, floodwater contaminated with domestic waste has the potential to carry disease agents, such as pathogenic bacteria and parasites that can cause diarrhea, leptospirosis, skin infections, and other environment-based diseases (Mustopa et al., 2023). This pollution also reduces the quality of groundwater and rivers, accelerates environmental degradation, and reduces the comfort and aesthetics of the area. In the long term, these conditions can affect the quality of life of the community and increase the burden on the government in handling health and hygiene (Puspitasari et al., 2022).

The waste that accumulates in the Laden area generally consists of organic and inorganic waste from household activities and traditional markets. Organic waste includes food scraps, leaves, kitchen waste, and materials that decompose naturally, while inorganic waste includes plastic, beverage bottles, cans, rubber, and styrofoam, which are difficult to decompose and remain in the environment for a long time (Sugeng, Jumiati, & Desmaiani, 2025). Irregular waste sorting causes these two types of waste to mix and become difficult to manage, so that the increasing volume of waste carried by water flows and clogging drainage becomes a major factor triggering flooding in the area (Khufat, Warnidasari, & Firdaus, 2024).

Organic waste actually has high added value if managed properly, especially through the composting process (Laily, Muharram, & Agusty, 2023). Composting is a technique for processing organic waste into natural fertilizer that is rich in nutrients and safe for the environment (Izzati et al., 2025). Through decomposition by microorganisms, organic waste can be recycled into compost that is useful for improving soil quality, supporting organic farming, and reducing the use of chemical fertilizers (Kabelen, Tanjung, & Suharno, 2024). In addition to helping reduce the volume of waste disposed of in the environment, the use of compost also supports community-based waste management programs and has the potential to become a new source of income (Kurniawati et al., 2024).

The application of compost in the community has several important objectives, both from an environmental and social perspective (Izzati et al., 2025). Environmentally, compost helps reduce organic waste accumulation that contributes to clogging waterways and minimizes methane gas production from decomposing waste (Kurniawati et al., 2024). Socially and

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economically, composting can provide benefits in the form of affordable fertilizer for farmers or residents who have ornamental plants and yard plants (Akbari & Khadijah, 2024). The use of compost also increases soil fertility without causing negative impacts on the environment, making it very suitable for application in the concept of sustainable agriculture (Widyawati & Suparwata, 2024). Thus, compost is an effective solution for waste management and community empowerment (Wati et al., 2024).

Socialization activities on waste management and composting play an important role in raising public awareness of the importance of protecting the environment (Wati, Kosvianti, & Febriawati, 2024). Through these activities, community members gain knowledge about proper waste segregation, the benefits of composting, and the negative impacts of improper waste disposal on the environment and flood occurrence (Dewi & Mahadewi, 2025). A focus on mapping flood-prone areas in Pamekasan based on physical factors such as elevation, slope, rainfall, soil type, and land use. However, the study did not examine social aspects, particularly community awareness regarding organic waste management and composting practices as flood mitigation measures.

Furthermore, studies specifically investigating community awareness of organic waste management and composting as a flood mitigation strategy in Laden Village remain limited. Therefore, this study aims to address this research gap by analyzing the level of community awareness regarding organic waste management and its potential contribution to reducing flood risk. Previous study by Anwari & Makruf (2019), the novelty of this research lies in assessing community awareness levels, organic waste management practices-particularly composting-and their role in flood prevention efforts. It is expected that the findings will promote sustainable behavioral changes among community members, thereby reducing flood risk and significantly improving environmental quality in Laden Village.

Research Methods

This research uses a mixed methods design. Quantitative data were collected through questionnaires using Likert scales to measure community awareness in managing organic waste, while qualitative data were obtained from interviews and direct field observations to provide deeper understanding of the phenomena. This study focuses on in-depth investigation of events and phenomena in the real-life context of individuals or groups. The core of the descriptive approach is the collection of data in the form of words and images, not statistical numbers as in quantitative research (Shohibuddin & Sa'diyah, 2025). Our research collects qualitative data through three main techniques: open-ended questionnaires to obtain descriptions of respondents' experiences, in-depth interviews to explore the subjects' life narratives directly, and field observations to document phenomena and visual contexts factually. The data obtained are analyzed comprehensively to assess the level of public awareness regarding natural disasters, particularly floods that occur almost every year in the region.

This research was conducted in Laden Village, Pamekasan District, Pamekasan Regency, from Saturday, September 27, 2025, during the first observation to Friday, November 21, 2025, for the second observation, and included conducting socialization as a flood prevention effort. The equipment we used in the field consisted of response and observation questionnaires for the community and affected region, as well as evaluation questionnaires on the implementation of socialization for local residents. In addition, we also used mobile phones to document evidence of interviews, questionnaire completion, the socialization process, as well as the areas and rivers surveyed during the flood disaster. This activity was carried out through several stages as follows:

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Figure 1. Research Flow

The first stage in this research is problem identification. At this stage, we look for the research focus and the solutions to be implemented later, as well as try to explore the factors causing the problem, such as the lack of public awareness of flood disasters and other contributing factors. Next, in the field observation stage, which involves verification and collection of primary data directly at the research site, we examine in more depth the factors causing floods from the environment to the affected communities, to understand why such natural disasters occur. This information is obtained based on the results of questionnaires and direct interviews with the community. The next stage is to determine the best efforts we can make for flood disaster management solutions from various literature as references and knowledge about disaster management. Furthermore, in determining problem solutions, we agreed to conduct socialization on organic waste management as a solution to address flood disasters, as one of the adaptive solutions we can implement. The final stage is to conclude the research results with the interview results and perform a Likert scale calculation on the distributed questionnaire. The formula for calculating the Likert scale is as follows:

$$\% = \frac{Total\ Likert\ Score}{Number\ of\ Respondents \times Maximum\ Score} \times 100\%$$

Formula 1. Likert Scale Percentage

(Erinsyah et al., 2024).

The calculation of the index value uses the interval formula by dividing a total of 100 by the number of Likert score categories (4), so that each range has an interval distance of 25. Based on this interval, the score range is classified into four different categories: Strongly Disagree, Disagree, Agree, Strongly Agree. This classification allows a structured interpretation of respondents' feedback to determine overall performance level. The resulting index values are presented in Table 1.

Table 1. Likert Scale Index Value

Index Value	Interpretation	Score
0 % - 24.9 %	Strongly Disagree	1
25 % - 49.9 %	Disagree	2
50 % - 74.9 %	Agree	3
75 % - 100 %	Strongly Agree	4

(Erinsyah et al., 2024)

Result and Discussion

The findings of the study on community awareness regarding waste management and environmental cleanliness in Laden Village, Pamekasan indicate that residents demonstrate a relatively good level of environmental concern. Interviews with community members revealed that most residents are aware of the importance of maintaining cleanliness by refraining from littering. Residents who own vacant land tend to burn their household waste, while those without land prefer to pay for waste collection services. This condition suggests that waste management practices are generally understood by the community, although a small number of individuals still dispose of waste into the river. Field observations along the river area also showed that dredging activities are currently being carried out to reduce blockages and minimize flood risks. These findings reflect the first theme, namely an increasing level of community awareness regarding waste management, despite the persistence of undisciplined behavior among a minority of residents. This finding can be explained through environmental education theory, which suggests that environmental knowledge contributes to the development of pro-environmental attitudes and behaviors. The tendency of most residents to avoid littering indicates that awareness of environmental issues has influenced their daily waste management practices.



Figure 2. River Conditions in Laden Village, Pamekasan

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Quantitative data obtained from a community response questionnaire completed by nine respondents during the initial observation further support these findings. The questionnaire results showed a percentage score of 77.5%, indicating that community members have an adequate understanding of early warning signs of flooding. This figure suggests that residents possess a basic level of preparedness for potential disaster events. Similarly, questionnaires administered to neighborhood leaders during the same observation yielded a percentage of 76.25% with comparable indicators. These data represent the second theme, namely that environmental knowledge and disaster preparedness are relatively evenly distributed among both the general community and local environmental administrators. Both residents and region officials demonstrate an understanding of flood indicators and the importance of preventive actions, reflecting the development of a shared culture of environmental vigilance. From a disaster resilience perspective, community understanding of flood warning signs and preparedness measures represents an important component of adaptive capacity. These findings suggest that residents possess basic resilience characteristics that can reduce vulnerability during flood events.

Further observations conducted in two areas revealed that residents have clearly defined evacuation routes, are aware of the importance of routinely cleaning drainage channels, and have compiled data on vulnerable residents to prioritize evacuation efforts. Local administrators also maintain effective communication with the Regional Disaster Management Agency and the village administration during flood events. However, several challenges were identified, including limited evacuation equipment, dependence on government assistance, and the absence of accurate flood risk maps. These findings correspond to the third theme, namely structural challenges and limitations in environmental facilities that require improvement, despite the generally positive direction of community behavior. These conditions are consistent with disaster resilience frameworks, which emphasize preparedness planning, evacuation systems, and stakeholder coordination as key elements of community resilience. However, the lack of flood risk maps and evacuation equipment indicates that resilience capacity still requires further strengthening.

The socialization program conducted by the researchers under the theme “Processing Organic Waste into Compost” received a positive response from the community. Evaluation questionnaires assessing the implementation of the program yielded a score of 80%, encompassing positive perceptions of the students’ activities, increased environmental knowledge and awareness, and the perceived benefits of the program for the community. This socialization initiative was designed to address the common practice of burning household waste, considering that the majority of waste generated by residents consists of organic materials that can be processed into compost. The positive response indicates the fourth theme, namely the influence of educational interventions in enhancing community understanding and behavior related to waste management. Environmental education was shown to strengthen community awareness and provide more environmentally friendly alternative solutions. This result also reflects the principles of participatory environmental management. Community members were not only recipients of information but also became active participants in environmental improvement efforts through composting activities and waste reduction practices.

Overall, the thematic analysis identified four major themes emerging from this study: (1) relatively good but uneven community awareness of waste management, (2) community flood preparedness categorized as good based on questionnaire data, (3) challenges and limitations in technical facilities for flood mitigation, and (4) the effectiveness of environmental education in improving community knowledge and behavior. These four themes suggest that Laden Village has significant potential for strengthening pro-environmental behavior. The existing level of community awareness, combined with educational programs and improvements in

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environmental infrastructure, provides an important foundation for promoting more sustainable environmental management in the future.

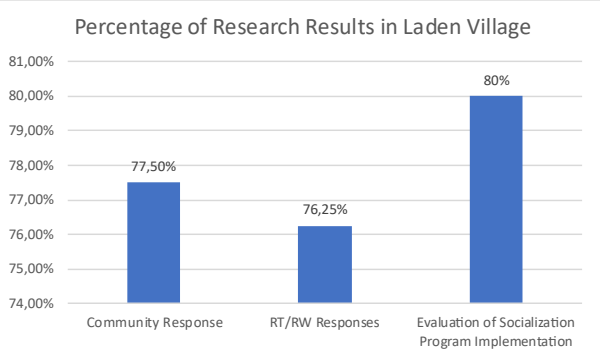


Figure 3. Percentage of Research Findings in Laden Village

Waste is essentially divided into two main types: organic and inorganic, each requiring different management methods. Organic waste, such as food scraps and other natural materials, has significant potential for reuse if properly processed, for example, as compost, which improves soil fertility and serves as an alternative to chemical fertilizers. Meanwhile, inorganic waste, including plastic, glass, and metal, poses a greater risk to the environment because it is difficult to decompose and can cause waste accumulation, pollution, blocked waterways, and even flooding if disposed of carelessly. Through waste management education, the public is given an understanding of the importance of implementing the 3R principle (reduce, reuse, recycle) to properly process organic waste and recycle inorganic waste into more useful products, thus enabling more responsible and sustainable waste management (Nindya et al., 2022).

Compost is an organic fertilizer formed through the decomposition of natural materials such as household food scraps, dried leaves, and vegetable and fruit waste. This decomposition produces nutrient-rich material, making it highly beneficial for sustainably improving the quality and productivity of agricultural land. In addition to improving soil structure and increasing its fertility, compost also plays a role in reducing environmental pollution by diverting organic waste from direct disposal into nature. The composting process itself is relatively easy, inexpensive, and environmentally friendly because it utilizes abundantly available materials without incurring additional costs, thus providing economic value. Therefore, compost can be understood as the processed product of organic waste that is converted into a high-value fertilizer for plants and the environment (Firdani, Alfian, & Saputra, 2023).

Organic fertilizer from food waste is a product of processing household organic waste such as vegetable, fruit, and leaf scraps, which is converted through a fermentation process by microorganisms into a nutrient-rich solution that can improve soil fertility and plant growth. Organic waste that is easily decomposed by microbes will produce liquid fertilizer after being fermented using EM4 bioactivator and supplemented with nutrients such as sugar. This process not only provides essential nutrients such as nitrogen, phosphorus, and potassium for plants but also helps reduce the volume of household waste, prevent environmental pollution, and produce compost residue and a small amount of biogas as useful byproducts (Rohmadi, Septiana, & Astuti, 2022).



Figure 4. Interview and Observation Activities in the Laden Village Community, Pamekasan

Observations from community interviews indicate that most residents have a more open and positive outlook on waste management, making them less likely to litter. However, some individuals still choose to dump their waste directly into the river, which can worsen environmental conditions. Community behaviors regarding waste management also vary; residents with vacant land often burn their own waste, while those without the space to manage it further prefer to use the services of sanitation workers. At the same time, the river used as the observation location is currently being dredged to improve water flow and reduce the risk of blockages caused by accumulated waste. Overall, this situation

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indicates progress in public awareness, although further guidance and supervision are still needed to ensure more equitable and responsible waste management.

Based on the results of a questionnaire conducted in two neighborhood associations in Laden Village, it was found that the area has several conditions that are already well-functioning in flood mitigation efforts. Evacuation routes are clearly available and easily accessible, residents demonstrate a high level of awareness in cleaning water channels regularly, and there are posts or temporary shelters suitable for use in emergencies. Furthermore, the region also have complete data on vulnerable residents such as the elderly, children, and people with disabilities, and are able to maintain effective communication with the Regional Disaster Management Agency and the sub-district office during floods. However, several issues still require attention, such as limited rescue and evacuation equipment, high dependence on government assistance, and the lack of accurate flood risk data or maps. On the other hand, several statements disagreed with the RT/RW, including that public facilities such as roads and bridges are considered adequate to deal with flooding, and that residents no longer dump large amounts of garbage into water channels or rivers. These findings indicate that although flood preparedness has been established, there is still a need to strengthen facilities, increase community independence, and improve disaster data to ensure more optimal flood management.



Figure 5. Socialization Activities in the Laden Village Community, Pamekasan

Based on the results of a questionnaire administered to residents, it was found that the community generally has a fairly good level of preparedness for potential flooding. Residents understand the early signs of flooding, have access to a rapid information system regarding flood warnings, and have prepared the necessary emergency equipment. Most residents also know the nearest evacuation sites, although some elderly respondents lack this understanding. Mutual assistance and mutual cooperation among residents further strengthen community preparedness for flood threats. However, weaknesses remain, such as low community participation in disaster awareness campaigns or training. Meanwhile, residents disagreed with several statements, such as the belief that evacuation routes are unimportant, maintaining clean water channels is not a personal responsibility, the need to prepare for emergencies because floods rarely occur, or a lack of concern for post-flood environmental conditions. This indicates that although residents have a good basic understanding of flooding, increased disaster education and training are still needed to strengthen overall community preparedness.

Based on interviews and field observations in Laden Village, it appears that the community is beginning to show positive changes in waste management and flood preparedness behavior, although several issues remain that require further attention. Interviews with residents revealed that most have realized the importance of maintaining environmental cleanliness, thus they tend to avoid littering. Field observations indicated that waterways and rivers in the area are undergoing dredging to reduce the risk of blockages. However, residents are still found throwing trash into the river or burning it on vacant land, especially those without access to adequate waste management facilities. Furthermore, the questionnaire results indicate that flood preparedness is well established, reflected in the availability of evacuation routes, complete data on vulnerable residents, and good communication between neighborhood units and relevant parties. However, shortcomings remain, such as a lack of rescue facilities, low participation in disaster awareness campaigns, and the lack of accurate flood risk maps. Overall, the combination of interview and observation findings indicates that although public awareness has increased, Laden Village still requires strengthening education, environmental monitoring, and improving supporting facilities to ensure optimal and sustainable flood mitigation and waste management efforts.

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The overall condition of Laden Village indicates progress in environmental management and flood mitigation efforts, although several aspects still need to be strengthened. Field observations indicate that most residents have improved awareness of waste management, as evidenced by their habit of not littering and efforts to maintain clean water channels. Furthermore, supporting facilities such as evacuation routes, emergency posts, and data collection for vulnerable groups are available and functioning quite well. However, several issues persist, such as residents continuing to dump waste into the river, the practice of burning waste by vacant landowners, limited evacuation facilities, and minimal community participation in disaster awareness activities. The lack of comprehensive flood risk data and reliance on government assistance also indicate that mitigation capacity still needs to be improved. Therefore, despite positive developments in community awareness and preparedness, Laden Village still requires increased education, supervision, support facilities, and community empowerment to ensure more effective and equitable waste management and flood mitigation.

Field findings in Laden Village indicate that some residents still throw waste into the river and burn it due to limited facilities. This aligns with the conditions in Sindanglaya Village reported in a journal, where the lack of landfill space and low community awareness often result in waste ending up in the river or being burned (Darmaraja et al., 2024). This study confirms that the main problem is not only the lack of facilities, but also the community's weak understanding of waste management, which impacts environmental pollution and reduces the quality of life. This aligns with the results of interviews in Laden Village, which showed that although some residents have positive awareness, there are still groups who do not understand the environmental risks of littering. Training and outreach on processing organic waste into compost, as proven effective in Sindanglaya Village in improving community knowledge and skills (Darmaraja et al., 2024), is a highly relevant solution for implementation in Laden Village. By introducing simple composting techniques that utilize kitchen scraps and leaves, the Laden Village community can not only reduce waste generation that has the potential to clog waterways but also contribute to flood mitigation by improving environmental quality. Furthermore, the success of the Participatory Action Research-based composting program in Sindanglaya demonstrated that direct community involvement in the education process can foster sustainable behavioral change (Darmaraja et al., 2024). Therefore, the integration of research findings suggests that strengthening outreach and training on organic waste management is a strategic step that can improve Laden Village's preparedness, both in terms of environmental cleanliness and flood risk mitigation.

Conclusion

Based on the findings, the level of community awareness regarding waste management and flood mitigation in Laden Village is relatively good, although it is not yet consistently reflected across all residents. The study demonstrates that community understanding of environmental cleanliness, proper waste management, and flood preparedness contributes to reducing environmental risks. In particular, the composting socialization program proved effective in increasing environmental knowledge and encouraging more sustainable waste management practices. Conceptually, this study highlights the close relationship between waste management behavior and flood risk reduction, suggesting that environmental stewardship can serve as an important component of community-based disaster mitigation.

From an environmental education perspective, the findings emphasize the value of continuous, participatory, and practice-oriented educational programs in fostering long-term environmental awareness and behavioral change. Furthermore, this study proposes a collaborative community management model that integrates environmental education, household-level organic waste processing, active community participation, and support from local government and educational institutions. Strengthening this collaboration,

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along with improving mitigation facilities and infrastructure, can contribute to more sustainable environmental management and enhanced flood resilience at the local level.

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