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Preparedness and Risk Perception of Students Living in Flood Disaster-Vulnerable Areas for Natural Disasters

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ABSTRACT

The study aims to determine the level of risk perception and preparedness among students living in flood-prone areas. A quantitative descriptive approach was adopted, employing purposive sampling to select 40 respondents based on specific criteria such as age, gender, domicile, and prior flooding experience. Data collection was conducted through questionnaires focusing on students' knowledge, attitudes, and actions related to flood disasters. The findings revealed that students' knowledge of flood preparedness is categorized as high, reflecting their awareness and readiness to face potential flood hazards. Statistical analysis showed that the Flood Risk Perception variable had a t-count of 13.803, exceeding the t-table value of 1.67, indicating a significant relationship between risk perception and disaster preparedness. Similarly, the preparedness variable also demonstrated a t-count of 13.803, emphasizing that students in Kuta Lhoksukon Village are at a considerable risk of experiencing floods in the future. Students' perceptions highlighted a strong sense of responsibility and understanding regarding the consequences of floods, emphasizing the importance of proactive measures in disaster risk reduction. The study underscores the critical need to enhance disaster education and preparedness programs in flood-prone regions to ensure a resilient student population capable of minimizing risks and mitigating the impacts of natural disasters.

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1. INTRODUCTION

Indonesia is a country that is at high risk of experiencing natural disasters because of its geographical location. It is known that natural disasters occur due to a series of natural phenomena such as earthquakes, tsunamis, volcanic eruptions, floods, droughts, storms, and landslides. Indonesia, which has a tropical climate, has two seasons, namely the dry season. This condition ranks Indonesia third as the country most frequently hit by floods and most affected worldwide, after India and China. For this reason, we must try to reduce the risk of disasters (Rahayu et al., 2023).

Flooding is a world problem, and every year, several areas are affected by flooding, especially during the rainy season (Yusup et al., 2023). Changes in the environment will sooner or later occur due to various factors, one of which is human activity that is unintentional or contrary to the daily environment. Changes in one or more environmental factors will affect other ecological factors to varying degrees (Bennett et al., 2023). Indonesia often faces natural disasters like floods when the rainy season arrives. Most lowland areas in Indonesia are at risk of being submerged in water. Currently, several places in Indonesia are very vulnerable to flooding. Based on statistical data, three regions in Indonesia have the highest level of flood vulnerability, namely North Sumatra, West Java, and Aceh. Especially for Aceh Province, every rainy season, almost all districts are hit by floods, such as Central Aceh, East Aceh, North Aceh, Aceh Jaya, Nagan Raya, West Aceh, Southwest Aceh, South Aceh, Southeast Aceh, and Aceh. Singkil (Kimijima & Nagai, 2023). This is caused by continuous rain and the loss of water catchment areas such as forests, which is detrimental to the community.

Community preparedness is essential in handling flood disasters because it influences how people behave when a disaster occurs (Ismail & Akbari, 2021). Understanding the nature of the crisis is a crucial component of preparedness. Knowledge and attitudes are the initial benchmarks for a community's disaster preparedness. Knowledge also helps people understand the dangers of disasters to implement necessary conservation and preparedness measures (Priyatna et al., 2023). By improving disaster preparedness, communities can minimize the risk of death, property loss, and lifestyle changes when facing an emergency. Law Number 24 of 2007 defines preparedness as a series of actions carried out before a disaster occurs through appropriate and effective planning and protocols. The five components of preparedness include warning systems, emergency planning, policies and guidelines, knowledge and attitudes, and resource mobilization. Activities related to preparation are intended to reduce the dangers arising from one-day and long-term disasters (Rijal et al., 2024).

The primary and essential component in community readiness to face disasters is knowledge. Preparedness is crucial in proactive disaster preparedness efforts before a disaster occurs and is one component of the disaster management process (Rimba et al., 2023). Many parties urge the public to be aware of natural disasters to reduce the impact of disasters. Mitigation means taking steps to minimize damage so that losses can be minimized. Mitigation includes protective actions that can be initiated, from pre-disaster preparedness to disaster risk assessment and disaster management in the form of rescue, recovery, and resettlement. Learning or education is one of the most strategic mitigation strategies available. Education is a powerful tool for improving behavior in disaster response. (Kardhana et al., 2022).

One of the development sectors affected by disasters is education. Therefore, we must foster a culture of disaster resilience in our society, especially children and students. Children are parties who need to be protected and have increased knowledge about disasters (Dartanto, 2022). One attractive case study location is a sub-district in North Aceh Regency

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called Lhok Sukon. Schools in this sub-district are always affected by flood disasters. Not only school buildings but most of the student dormitories were also flooded. However, students do not yet know the dangers that will occur if a flood occurs. They don't know that floods can pose risks such as electric currents, electric shocks, poisonous animals, and animals that spread disease. Therefore, we need to increase students' knowledge about flood disasters. (Sutriningsih et al., 2023). This study analyses students' preparedness and risk perception in flood-affected areas.

2. METHODS

2.1 Research Approach

This part explains how the research is conducted, research design, data collecting techniques, instrument development, and data analysis techniques. Describe conclusively that the method This research uses a descriptive method with a quantitative approach. A quantitative research approach analyses figures based on data, which is then explained using appropriate statistics (Nakamura et al., 2023). The results of statistical tests such as the t-test can be used to show a significant relationship with objective research. So, directional relationships are found based on hypotheses and statistical test results, not scientific logic alone.

Objects are School students based in Lhoksukon District, North Aceh Regency. Research Objective: To characterize something or an object precisely and methodically based on the facts and characteristics of the studied object or subject. Interviews with the public and the distribution of questionnaires to elementary school students will be used. (Noerhayati et al., 2024).

2.2 Data Collection Technique

The quantitative method of in-depth data collection techniques is by (Soetanto et al., 2022):

- Observation: observation is a data collection technique that uses direct observation of the school to obtain accurate results or evidence. To support and complement the research results on the perception of risk and preparedness among elementary school students.
- Questionnaire: collecting data by distributing several questions that researchers have prepared for respondents to fill in. In context, this questionnaire was distributed directly to students affected by the flood disaster. The aim is to collect information from them regarding their experiences or perceptions regarding flood disasters.
- Data and information on the flood disaster were collected through documentation. Data and information can be found in various forms, including books, archives, written documents, statistical data, and images. This documentation method helps obtain information about flood risk and conditions in the area concerned.

3. RESULTS AND DISCUSSION

3.1 Research Overview

North Aceh Regency is at coordinates 95 ^{0} 52 ' - 97 ^{0} 31 ' East Longitude and 4 ^{0} 46'-5 ^{0} 18' North Latitude. The North Aceh region borders North Aceh Regency to the east with East North Aceh Regency; to the west, it borders North Aceh Regency with Bireuen Regency; to the south, it borders Bener Meriah Regency. To the north, it borders North Aceh Regency with Lhokseumawe City and the Malacca Strait. North Aceh Regency has a land area of 57,365.67 km^2 , a water area of 29,611.11 km^2 , and an area of 57,956.00 km^2, (Basri, 2021).

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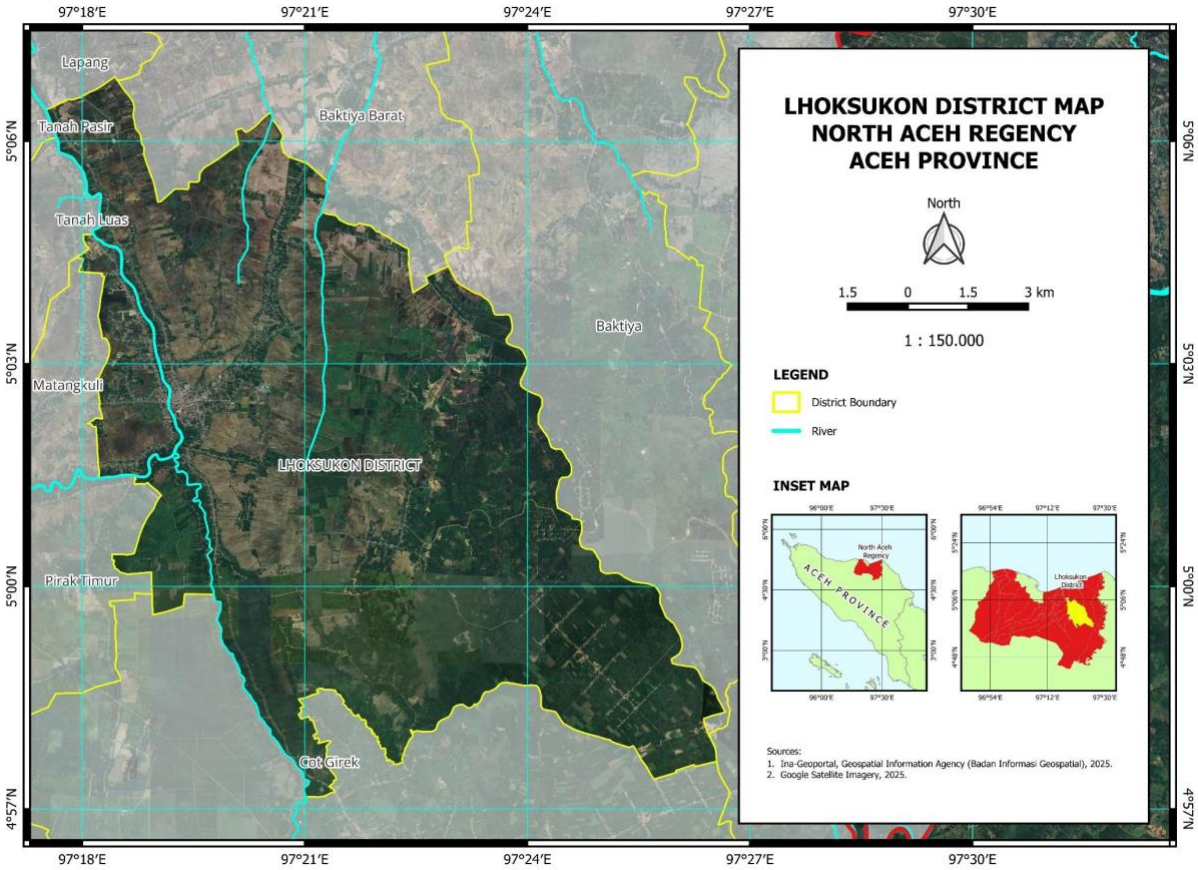

Figure 1. Map of Lhoksukon District, North Aceh Regency, Aceh Province, Indonesia.

Statistical methods To verify statements are called hypothesis testing. The population related to the hypothesis is obtained from sample data. SmartPLS statistical program analysis, namely statistical tests, is used to verify the truth of the hypothesis and confirm the evidence provided by the researcher in differentiating the means of two populations, supporting the t-test used in the research. (Lumban-Gaol et al., 2024).

$$r_{Hitung} = \frac{n(\sum xy) - (\sum x).(\sum y)}{\sqrt{\left\{n.\sum \lim_{n\to\varphi} x^2 - (\sum x)^1\right\}.\left\{n.y^2 - (\sum y)^2\right\}}}$$

Table 1. T-Test Statistics

No	Variable	Original Sample (o)	T- Count	P Value (0.05)
1	Flood Risk Perception (X) ≥ Preparedness (Y)	0.691	13,803	0,000

Source: Processed primary data (2023)

Table 1 shows the significant relationships identified through the Bootstrapping method. The resulting t-t value is more critical than the t-table value (1.67). Therefore, the estimated path coefficient is considered significant in Table 2. Flood Risk Perception, a Ta value of 13,803 has been calculated, which exceeds the table value (1.67), thus indicating that there is a significant influence between the Flood Risk Perception variable and preparedness. Meanwhile, for the Preparedness variable, the t-count was also obtained at 13.803 and

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exceeded the t-table value (1.67), which shows that students have the potential to face the risk of flood disasters in the future.

3.2 Perception

Perception is the method a person uses to evaluate or interpret other people. (Soekarno et al., 2024) Perception is an individual's experience of an object, event, or relationship, which the individual then processes and analyses. This perception process continues when a person interacts with their environment, and every interaction that produces a response or reaction forms behavior, opinions, and attitudes that vary between individuals (Mulia & Handayani, 2024). Results of questionnaire data processing given to elementary school students, the average answers stated that:

1) In my opinion, my neighborhood school could be flooded at any time
2) In my opinion, Kuta Lhoksukon Village can overcome flooding in the future
3) If the school area is hit by flooding, I think daily life will be disrupted for a long time

Three indicators positively answered students' perceptions of the impact of risk.

1) If my neighborhood were flooded, walking around would cause severe damage
2) My school is located in a flood area
3) If a flood hits my school area, my family and I risk becoming victims.

Meanwhile, students' answers to these three indicators had negative values.

3.3 Preparedness

Preparedness is an action taken to anticipate disasters through organizing and implementing appropriate and valuable measures. According to (Shuman et al., 2022; Pamungkas et al., 2023), preparedness refers to activities and steps taken in advance to ensure an adequate response to the impacts of hazards, including timely and efficient warning and protecting residents and property objects from threatened areas. Preparedness is an essential component in disaster management, which includes the ability of communities from all levels to recognize threats around them and have ways to deal with disasters (Namutebi et al., 2023). Preparedness is carried out before a disaster, aiming to build and increase capacity. To manage emergencies effectively and facilitate the transition from the response stage to sustainable recovery. As for the question, the indicators that are categorized as positive are:

1) Move to higher areas to avoid the danger of flooding
2) Follow orders from authorities
3) Do not enter flooded areas
4) Don't want to leave the house to play in the water
5) I have a plan for emergency preparedness for disasters
6) I have practiced What to do If an emergency occurs at school.
7) I have practiced What to do If an emergency occurs at home.
8) I know the evacuation location when a flood occurs
9) I have a first-aid kit
10) I have a flashlight with battery backup
11) I have prepared a supply of water and food during the day
12) I have my emergency phone number.

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Based on the results of research entitled Risk Perception and Student Preparedness Against Floods it can be concluded that

- Many students' perceptions of the flood disaster have a terrible perception. Good. Based on the results of research regarding students' perceptions of flood disasters based on knowledge, attitudes, and actions that researchers have carried out, students' perceptions of flood disasters are included in this group, proven through a questionnaire with a percentage of 40% of disaster activities that occur. The amount of work students do is still minimal, carrying out cleaning and maintenance activities.
- Students can prepare themselves to face floods by providing the necessary skills and improving their ability to deal with flood situations. Apart from that, they can also collaborate in cleaning water channels so that no buildup of rubbish can obstruct water flow. The research results show that student preparedness for flood disasters is relatively high. This can be seen from the questionnaire results, which reached a percentage of 90%.

The perception that arises in students is self-confidence. They relate to the extent of concern for possible consequences arising, and disasters depend on their actions to minimize risks and prepare for disasters. Preparedness is essential for students because it will help them reduce the risks that may occur during a flood disaster (Hayati et al., 2022).

It can be concluded that experience or knowledge regarding risk perception and readiness knowledge is included in the high category; this statement was obtained from the questionnaire results, which were processed using SmartPLS. This chapter contains the results of the research. The results can be presented in the form of text, tables, images, maps, and accompanying interpretations associated with the results that have been reported. Images and Maps are made as simple as possible to be understood easily. Drawings, maps, and titles are given source images with the numbering sequence. The table shown above title is also accompanied by sequentially numbering. Pictures, Maps, and tables should be cited in the body text. Maps must be made in color or grayscale format, but each value/object is differences are visible. Design a layout simplified map that can be included in the text without reducing the map's content (Sejati et al., 2023).

The discussion can be in separate sub-sections or integrated within the result section. The author should discuss the findings from the research with relevant literature.

4. CONCLUSIONS

Based on the results of research entitled Risk Perception and Student Preparedness Against Floods it can be concluded that many students' perceptions of the flood disaster have a terrible perception. Good. Based on the results of research regarding students' perceptions of flood disasters based on knowledge, attitudes, and actions that researchers have carried out, students' perceptions of flood disasters are included in this group, proven through a questionnaire with a percentage of 40% of disaster activities that occur. The amount of work students do is still minimal, carrying out cleaning and maintenance activities. Students can prepare themselves to face floods by providing the necessary skills and improving their ability to deal with flood situations. Apart from that, they can also collaborate in cleaning water channels so that no buildup of rubbish can obstruct water flow. The research results show that student preparedness for flood disasters is relatively high. This can be seen from the questionnaire results, which reached a percentage of 90%.

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5. RECOMMENDATIONS

It is hoped that further researchers will be able to develop research insights into perceptions and preparedness among students in facing flood disasters in detail and add variables other than perceptions and preparedness so that they can be analyzed more deeply and comprehensively.

6. REFERENCES

Basri, H. (2021). Pengelolaan, pengawasan kawasan pesisir dan laut di Indonesia. *REUSAM: Jurnal Ilmu Hukum*, 8(2), 1.

Bennett, W. G., Karunarathna, H., Xuan, Y., Kusuma, M. S. B., Farid, M., Kuntoro, A. A., Rahayu, H. P., Kombaitan, B., Septiadi, D., Kesuma, T. N. A., Haigh, R., & Amaratunga, D. (2023). Modelling compound flooding: a case study from Jakarta, Indonesia. *Natural Hazards*, *118*(1), 277–305.

Dartanto, T. (2022). Natural disasters, mitigation and household welfare in Indonesia: Evidence from a large-scale longitudinal survey. *Cogent Economics and Finance*, *10*(1).

Hayati, N., Widodo, A., Kurniawan, A., Sanjiwani, I. D. M. A., Darminto, M. R., Yudha, I. S., & Sumantyo, J. T. S. (2022). Small baselines techniques of time series InSAR to monitor and predict land subsidence causing flood vulnerability in Sidoarjo, Indonesia. *Geomatics, Natural Hazards and Risk*, 13(1), 2124–2150.

Ismail, R., & Akbari, M. (2021). Implementation of E-Learning Method in Earthquake Learning. *Proceedings of the 2nd International Conference on Science, Technology, and Modern Society (ICSTMS 2020)*, 576(Icstms 2020), 197–200.

Kardhana, H., Valerian, J. R., Rohmat, F. I. W., & Kusuma, M. S. B. (2022). Improving Jakarta's Katulampa barrage extreme water level prediction using satellite-based long short-term memory (LSTM) neural networks. *Water (Switzerland)*, 14(9).

Kimijima, S., & Nagai, M. (2023). Monitoring Mining-Induced Geo-Hazards in a Contaminated Mountainous Region of Indonesia Using Satellite Imagery. *Remote Sensing*, 15(13), 1–17.

Lumban-Gaol, J., Sumantyo, J. T. S., Tambunan, E., Situmorang, D., Antara, I. M. O. G., Sinurat, M. E., Suhita, N. P. A. R., Osawa, T., & Arhatin, R. E. (2024). Sea level rise, land subsidence, and flood disaster vulnerability assessment: a case study in Medan City, Indonesia. *Remote Sensing*, *16*(5).

Mulia, F. A., & Handayani, W. (2024). Assessment and comparison of community resilience to floods and tsunamis in Padang, Indonesia. *Journal of Integrated Disaster Risk Management*, 14(1), 74–97.

Nakamura, S., Abanokova, K., Dang, H. A. H., Takamatsu, S., Pei, C., & Prospere, D. (2023). Is climate change slowing the urban escalator out of poverty? evidence from Chile, Colombia, and Indonesia. *International Journal of Environmental Research and Public Healt*h, 20(6).

DOI: : https://doi.org/10.17509/gea.v25i1.74639
p-ISSN 1412-0313 e- ISSN 2549-7529

Namutebi, M., Nalwadda, G. K., Kasasa, S., Muwanguzi, P. A., Ndikuno, C. K., & Kaye, D. K. (2023). Readiness of rural health facilities to provide immediate postpartum care in Uganda. *BMC Health Services Research*, 23(1), 1–16.

Noerhayati, E., Mustika, S. N., Ingsih, I. S., & Rahmawati, A. (2024). Analysis of factors in community willingness to managefloods in East Java during the pandemic Jàmbá-Journal of Disaster Risk Studies. *Jàmbá - Journal of Disaster Risk Studies AOSIS*, 1–11.

Pamungkas, T. D., Aliyan, S. A., Nurfalah, I., Ningrum, E., & Maryani, E. (2023). Preparedness of the community in facing disasters like earthquakes (Case: Cisarua, Indonesia). *Jàmbá-Journal of Disaster Risk Studies*, *15*(1), 1438.

Priyatna, M., Khomarudin, M. R., Wijaya, S. K., Yulianto, F., Nugroho, G., Afgatiani, P. M., Rarasati, A., & Hussein, M. A. (2023). Rapid flood mapping using statistical sampling threshold based on sentinel-1 imagery in the Barito watershed, South Kalimantan province, Indonesia. *Journal of Engineering and Technological Sciences*, 55(1), 98–107.

Rahayu, R., Mathias, S. A., Reaney, S., Vesuviano, G., Suwarman, R., & Ramdhan, A. M. (2023). Impact of land cover, rainfall and topography on flood risk in West Java. *Natural Hazards*, 116(2), 1735–1758.

Rijal, S., Nursaputra, M., Chairil, A., & Dari, H. U. (2024). Flood susceptibility analysis using frequency ratio method in Walanae watershed. *International Journal of Sustainable Development and Planning*, 19(3), 823–832.

Rimba, A. B., Arumansawang, A., Utama, I. P. W., Chapagain, S. K., Bunga, M. N., Mohan, G., Setiawan, K. T., & Osawa, T. (2023). Cloud-based machine learning for flood policy recommendations in Makassar city, Indonesia. *Water (Switzerland)*, 15(21).

Sejati, A. W., Putri, S. N. A. K., Rahayu, S., Buchori, I., Rahayu, K., Andika Wiratmaja, I. G. A. M., Muzaki, A. J., & Basuki, Y. (2023). Flood hazard risk assessment based on multicriteria spatial analysis GIS as input for spatial planning policies in Tegal Regency, Indonesia. *Geographica Pannonica*, 27(1), 50–68.

Shuman, C. J., Peahl, A. F., Pareddy, N., Morgan, M. E., Chiangong, J., Veliz, P. T., & Dalton, V. K. (2022). Postpartum depression and associated risk factors during the COVID-19 pandemic. *BMC Research Notes*, 15(1), 1–5.

Soekarno, I., Adityawan, M. B., Sandi, C., Amatullah, S. I., Farid, M., Suryadi, Y., Yakti, B. P., Chrysanti, A., Kuntoro, A. A., Widyaningtias, & Purnama, M. R. (2024). A methodology for water resource management and the planning of the coastal reservoir in Indonesia. *Water (Switzerland)*, 16(2).

Soetanto, R., Hermawan, F., Drosou, N., Bosher, L., Utomo, J., & Hatmoko, D. (2022). Perceptions of social responsibility for community resilience to flooding: a comparison between communities in Indonesia and the UK. *Water,* 14, 433.

Sutriningsih, A., Wahyuni, C. U., Haksama, S., Notobroto, H. B., & Haryuni, S. (2023). Validation of public health center resilience questionnaire in flood-prone areas of East Java province, Indonesia. *Journal of Public Health in Africa*, 14(S2).

Yusup, M., Tarigan, P. I. S., Noviansah, K., Ridwana, R., & Aliyan, S. A. (2023). Identifikasi Genangan Banjir Menggunakan Sentinel-1 dan Korelasinya dengan Kerawanan Banjir di Kabupaten Barito Selatan. Geo-Image Journal, 12(1), 62-70.

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