

## Hydrometeorological Disaster Mitigation Based On Local Wisdom Of The Acehnese Community

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### Abstract

This study aims to examine hydrometeorological disaster mitigation based on the local wisdom of Acehese communities specifically in Aceh Besar Regency, Southeast Aceh Regency, Langsa City, and Aceh Singkil Regency. A descriptive qualitative method was employed, utilizing data collection techniques such as interviews, observation, documentation, and literature review. The study involved 100 informants selected through purposive sampling, chosen based on criteria including advanced age and a solid understanding of as well as experience with Acehese local wisdom regarding disaster mitigation. Finally, the Delphi method was used for data analysis. The research findings indicate that the *Ie Raya* local wisdom among the Brayeun community (Aceh Besar Regency) and the *banjikh* and *belin lawe* local wisdom in the Lawe Hijau Metuah village community (Southeast Aceh Regency) are closely linked to flash flood mitigation efforts; the *ie tuara* local wisdom in the Kuala Langsa community is closely linked to tidal flood mitigation efforts; and the local knowledge of communities in Rawa Singkil and Teluk Rumbia (Aceh Singkil Regency) is closely linked to general flood mitigation. Communities in each research area possess distinct local knowledge regarding natural signs preceding disasters knowledge rooted in community experience and passed down orally through stories from one generation to the next. This body of local knowledge serves as a traditional early warning system, deemed effective and beneficial for mitigating the impacts of hydrometeorological disasters such as flash floods, tidal floods, and general flooding. It is hoped that this local knowledge will be preserved and passed on effectively, and utilized in education as a resource for teaching local-wisdom-based disaster mitigation across various educational levels.

**Keywords:** Mitigation; Hydrometeorological Disasters; Local Wisdom; Community

### 1. INTRODUCTION

Hydrometeorological disasters consist of two words: "hydro," meaning water, and "meteorology," meaning weather. Therefore, it can be concluded that these disasters are caused by water, weather, and climate factors such as rainfall, wind, and humidity. Meanwhile, according to the National Disaster Management Agency (BNPB), hydrometeorological disasters are disasters caused by meteorological parameters such as rainfall, temperature, humidity, and wind, for example, floods, droughts, storms, and forest

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fires (BNPB, 2018). Hydrometeorological disasters are disasters caused by instability in climate conditions, the hydrological cycle, and environmental changes occurring on the Earth's surface, which can lead to flash floods, droughts, landslides, tornadoes, and ecosystem damage (Sabrina et al., 2021; Hermon, 2012).

According to Muhari (2025), hydrometeorological disasters are divided into two types: wet hydrometeorological disasters such as floods, landslides, flash floods, extreme weather, and tidal waves (rob), and dry hydrometeorological disasters such as droughts and forest and land fires (KARHUTLA). The main causes of hydrometeorological disasters are divided into two: natural factors such as high rainfall, global climate change, and the La Nina phenomenon, which results in increased rainfall; and human factors such as deforestation, land conversion, unplanned urbanization, and poor drainage systems (Dwiatmodjo, 2023). Protected forest areas that should function as water catchment areas have been impacted by illegal logging, making them unable to withstand the overflow of water during heavy rains (Lubis, 2024). This causes mud, rocks, and even tree trunks to fall from mountain slopes during heavy rains, causing casualties and damaging infrastructure. These areas are also prone to landslides, which can be exacerbated by deforestation and prolonged heavy rains (Gunawan, 2023).

In 2025, the National Disaster Management Agency (BNPB) recorded 4,727 disasters in Indonesia, with hydrometeorological disasters accounting for 99.26% and geological disasters accounting for 0.74%, with disasters in the order of magnitude including floods, extreme weather, forest and land fires, landslides, and drought (BNPB, 2025). Based on information provided by the Acting Head of the National Disaster Management Agency (BNPB), The Head of the Aceh Disaster Management Agency (BPBA), Fadmi Ridwan, SP, MA, the phenomenon that occurred in Aceh Province was hit by 387 disasters, with losses of 249.5 billion, resulting in 575 people dying, 5408 people being injured, 862,411 heads of families or 2,421,674 being affected by the disaster, and 925,654 people having to evacuate due to the disaster that hit Aceh, floods occurred 72 times, forest and land fires occurred 102 times, whirlwinds 42 times, landslides 26 times, tidal waves 1 time, earthquakes 5 times, abrasion 2 times, fires 137 times (Imsaki, 2026).

One example of a hydrometeorological disaster that recently occurred in Aceh on November 26, 2025, namely the tropical cyclone Senyar, has succeeded in destroying 18 districts/cities in Aceh Province, such as Pidie Jaya Regency, Bireun, North Aceh, Lhokseumawe, East Aceh, Langsa, Aceh Tamiang, Bener Meriah, Bireun, Gayo Lues, Southeast Aceh, Aceh Jaya, West Aceh, Nagan Raya, Southwest Aceh, South Aceh, Aceh Singkil, and Subulussalam. Case studies in Aceh Province, the number of victims who died was 564 people, the number of victims missing was 28 people, the total number of people displaced was 5496 families, a total of 255,051 houses were damaged with details of 45,464 severely damaged houses, 60,307 moderately damaged houses, 149,280 lightly damaged houses (BNPB Data, 2026).

Given the frequency of hydrometeorological disasters in Aceh in particular and Indonesia in general, it has revived the public's memory of disaster mitigation based on local wisdom, particularly in Aceh Province. While there is a wealth of local wisdom that is beneficial for hydrometeorological disaster mitigation, people are often unaware that all of their practices are part of this local wisdom. Local wisdom in everyday life has various terms, but they share the same meaning and purpose. For example, indigenous wisdom, traditional wisdom, and indigenous inventions, as well as local knowledge (indigenous knowledge, local genius, and

invented tradition). In general, local wisdom is local ideas that are wise, imbued with wisdom, and possess good values that are embedded in and followed by members of the community (Sartini, 2004:111).

Maryani and Yani (2015:116) define the word "indigenous" (indu and gignere) as something born, developed, or produced naturally and natively in a region or place. Suyami et al. (2005:23) define local wisdom as wisdom or knowledge that gives rise to behavior as a result of adaptation to the environment. Keraf (2010) defines local wisdom as all forms of belief, understanding, or insight, as well as customs or ethics that guide human behavior in life. Local wisdom is a form of belief in the form of ideas, wisdom, knowledge, and understanding found within a particular community, as a form of community adaptation to its surroundings.

Local wisdom consists of various forms, including folktales and songs, including intangible forms of local wisdom (Ernawi, 2010:6). Folktales and songs are all forms of stories and songs that originate, exist, and are developed within the community. Typically, folktales and songs are passed down from previous generations orally within the community. All peoples, whether primitive or civilized, have sought to pass on their wisdom to the next generation through myths, stories, songs, and even cave paintings dating back 30,000 years (Birren & Svensson, 2005:3).

Myths, stories, folk songs, and even 30,000-year-old cave paintings found within communities are considered intangible forms of local wisdom. This is because these forms do not manifest in concrete physical forms (that can be seen, touched, or felt). Instead, they exist in the form of stories and folk songs conveyed orally (spoken), which can be heard by the community. As the community develops, the content of these stories and folk songs is translated into written form.

Various experiences within communities are expressed in the form of stories and folk songs, which serve as disaster mitigation efforts based on local wisdom. Disaster mitigation is the various steps or actions taken to protect oneself or reduce and minimize the negative impacts of a disaster in a community. Disaster mitigation is the actions to reduce or minimize the potential negative impacts of a disaster with a series of activities carried out by reducing the threat of disaster and the vulnerability of those threatened by disaster (Jokowinarno, 2011; Zakaria et al., 2011; Tondobala 2011). Then, (Wells and Coppersmith, 1994; Nielsen and Lidstone, 1998) In general, mitigation is defined as the effort or action to reduce the impact of a hazard before it occurs.

Disaster mitigation can also be carried out by providing guidelines on how to build preparedness for natural disasters (GeoHazard International, 2007; Sugimoto et al., 2010; ICHARM UNESCO, 2010; Murata et al., 2010). Furthermore, other steps and activities that can be carried out in disaster mitigation according to (Adiyoso and Kanegae, 2013; Murata et al., 2010) include: to minimize the impact of a disaster, communities must create a "disaster culture" through learning (preparing themselves with specific knowledge about disasters), routine training (practicing regularly to avoid knowledge loss), and practice (proficiency is proven through practice). The ultimate goal of disaster mitigation is to reduce the number of deaths and injuries when a disaster occurs in the community.

Based on the results of preliminary studies, several studies were found examining local community wisdom for hydrometeorological disaster mitigation, such as Utami and Tyas

(2021) Forms of Preparedness for Facing Flash Floods in the Wana Tribe, North Morowali Regency, Central Sulawesi. Surya and Fitriani (2020) The Role of Local Wisdom in Disaster Mitigation in Coastal Areas. Suparmini et al. (2014) Disaster mitigation based on local wisdom of the Baduy community. Sukma et al., (2024) Literature Review: Flood Disaster Mitigation Based on Local Wisdom. Rusmaniah et al., (2025) Local Community Wisdom in Flood Disaster Mitigation in Sungai Tabuk District. Rahastri et al., (2024) Local Wisdom in Environmental Sustainability in Rahtawu Village, Kudus Regency. Puspitasari (2018) Disaster mitigation based on local wisdom in Tieng Village, Wonosobo Regency. Kamasuta (2021) Landslide and Flash Flood Disaster Mitigation Based on Local Wisdom of Bentek Village Community, Gangga District, North Lombok Regency. Anwar et al., (2023) Disaster mitigation based on local wisdom in the development of natural tourism areas in Kahayya Village. Asrofi et al., (2017) Coastal Community Adaptation Strategy in Handling Tidal Flood Disasters and Its Implications for Regional Resilience (Study in Bedono Village, Sayung District, Demak Regency, Central Java). Dyah, et al., (2024) Literature Review: Flood Disaster Mitigation Based on Local Wisdom. Haliadi, et al. (2023) Local Wisdom of Tajio Tribe Community Based on Kaliburu Kata Disaster Mitigation, Donggala Regency, Central Sulawesi. Hasan, (2018) Local wisdom in water resource management of coastal communities in Aceh.

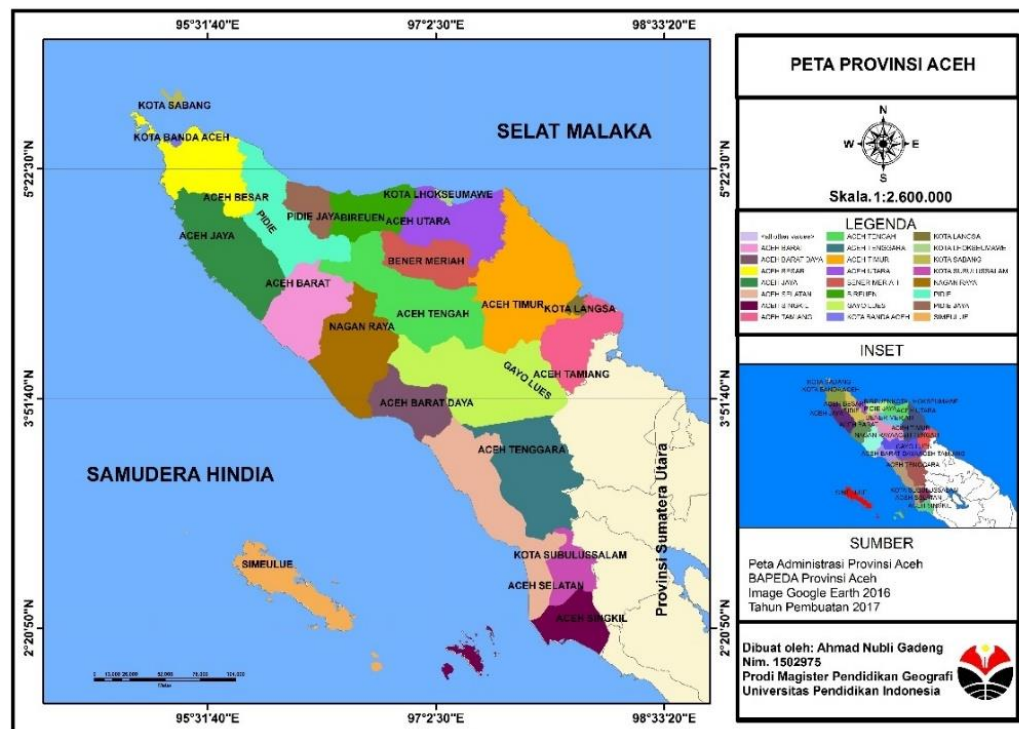
Previous research has generally addressed one community or one type of disaster separately, while studies comparing various forms of local knowledge in Aceh in dealing with flash floods, tidal floods, and riverine floods and identifying shared patterns in early warning systems, adaptation, and knowledge transmission are still limited. Furthermore, based on the results of initial observations conducted in several districts and cities in Aceh Province, several local wisdoms were also found in the Acehese community which would actually be useful for mitigating hydrometeorological disasters, however, many Acehese people do not yet know and understand these local wisdoms well, thus making researchers interested in researching more deeply regarding Hydrometeorological Disaster Mitigation Based on Local Wisdom of Acehese People. The formulation of the problem in this study is: 1) How is the local wisdom of *Ie Raya* for mitigating flash flood disasters in the Brayeun community in Aceh Besar Regency?. 2) How is local knowledge for mitigating flash flood disasters in Southeast Aceh Regency?. 3) How is the local knowledge of *Ie Tuara* for mitigating tidal flood disasters in Langsa City?. 4) How is local knowledge for mitigating flood disasters in the Rawa Singkil Area, Pulo Sarok Village, Aceh Singkil Regency?. 5) How is local knowledge for mitigating flood disasters in the Teluk Rumbia area of Aceh Singkil Regency?

## 2. METHOD

The research was conducted from February to March 2025 in four regencies/cities in Aceh Province: 1) Aceh Besar Regency, representing the East Aceh region, with 20 informants. 2) Langsa City, representing the East Aceh region, with 20 informants. 3) Southeast Aceh Regency, representing the Central Aceh region, with 20 informants. 4) Aceh Singkil, encompassing two villages representing the Southwest Aceh region, with 40 informants. This resulted in a total of 100 informants. A map of Aceh Province is shown below in Figure 1.

Furthermore, this study employed a descriptive qualitative method. The first data collection technique used in-depth interviews with all participants, categorized as described above.

Interviews are a face-to-face question-and-answer method used between the interviewer and the interviewee to collect data during the research in the Acehese community. Second, data collection involved observation, through the stages of observing all conditions, such as behavior and natural conditions, at the research site. Third, data collection used documentation studies, closely related to data sourced from important archives, such as manuscripts on local wisdom inherited from previous generations and various other relics found in Acehese society. Fourth, data collection used literature studies from various sources, such as books, journals, and internet materials, relevant to the discussion in this study.



**Figure 1.** Map of Aceh Province

Data analysis in this study used the Delphi method, a systematic method for gathering opinions from a group of experts through a series of questionnaires. There is a feedback mechanism through question rounds, while maintaining the anonymity of respondents' (experts') responses (Foley, 1972). The Delphi method is a structured communication technique originally developed as an interactive forecasting method that relies on a number of experts (Linstone, 1975). The Delphi method in its use creates a pattern of interaction between researchers and experts/specialists who are considered competent in the field of research study, because various answers obtained in the field during the research taking place in the community must first be confirmed with the expert or experts, in order to obtain certainty of correct and concrete answers, so as not to produce erroneous and doubtful data or also called biased data. In this study, the experts were the traditional leaders in each research location, MAA (Aceh Traditional Council), Head of BPBD in each research location.

### 3. RESULTS AND DISCUSSION

The research results will be divided into five sections: 1) Local wisdom of Ie Raya for flash flood mitigation in the Brayeun community in Aceh Besar Regency. 2) Local knowledge for flash flood mitigation in Southeast Aceh Regency. 3) Local knowledge of Ie Tuara for tidal flood mitigation in Langsa City. 4) Local knowledge for flood mitigation in the Rawa Singkil

area of Pulo Sarok Village, Aceh Singkil Regency. 5) Local knowledge for flood mitigation in the Teluk Rumbia area of Aceh Singkil Regency.

### Local Knowledge of Ie Raya in Brayeun, Aceh Besar Regency

The first research location was chosen in Brayeun, which is part of Gampong Meunasah Masjid, Leupung District, Aceh Besar Regency. Brayeun is one of the leading tourist destinations in Aceh Besar Regency, famous for its cool bathing spots surrounded by dense forests. Brayeun is frequently visited by tourists during the holiday season. Aceh Besar Regency was chosen to obtain data representing North East Aceh and is also located in the capital of Aceh Province. The following will show Figure 2, a map of the research location in Gampong Meunasah Mesjid.

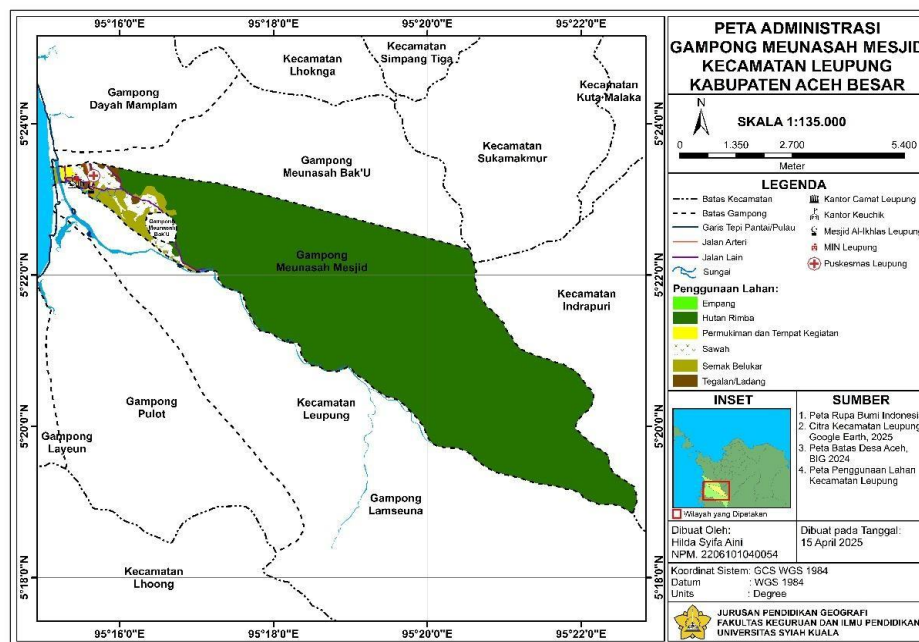
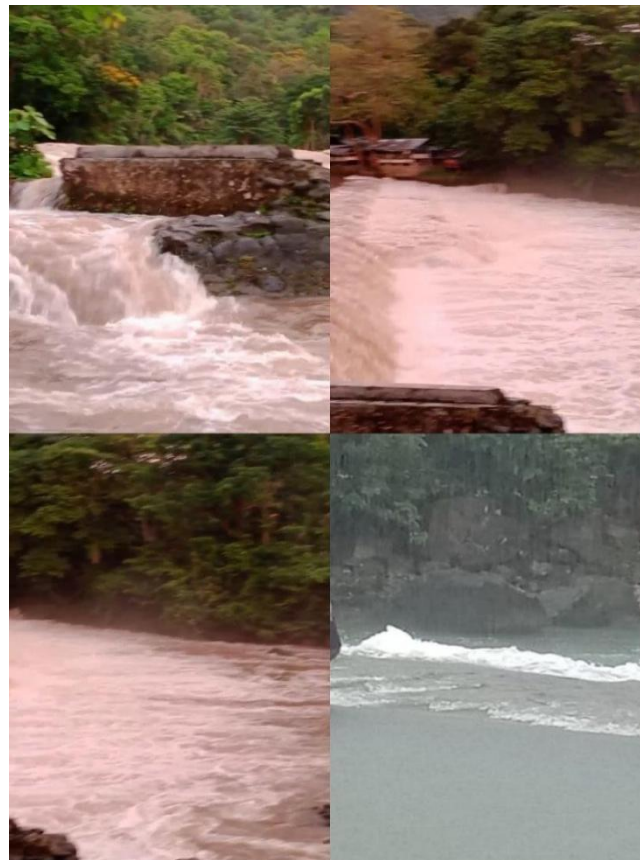


Figure 2. Map of the Research Location of Gampong Meunasah Mesjid

Based on the interview results, all informants in Brayeun are aware of Ie Raya. The local wisdom of Ie Raya has existed since the time of our ancestors, and some say that Ie Raya was known in the community after the tsunami. Marfaei (2012) local wisdom is the extraction of inherited experiences that have proven effective in disaster risk reduction. In the Acehese language, "ie" means water, and "raya" means big, so it can be interpreted as "big water" or as a large river that flows in the Brayeun area. In the Brayeun community, the term Ie Raya is used to describe extraordinary natural events that need to be watched out for or respected because of their great power and broad impact. Culturally, Ie Raya is considered a source of life; the river is the center of community activities, both for daily needs such as bathing, washing, and agricultural irrigation. In addition, the river is an important part of the local tradition of intensity. In local customs and culture, Ie Raya is even considered to have a "soul." Many parents in Brayeun still teach their children not to use foul language or behave carelessly around the river. This is a form of respect for nature, which is considered alive and powerful.

The Brayeun community understands the concept of a major flood, which occurs when rainfall is extremely high and continues for a long time, especially in mountainous areas where rivers originate. Heavy rain that lasts for approximately two days and two nights, or some say a week, with continuous rainfall on the mountaintops, is a major flood. A major flood describes

a condition where the volume of water increases significantly, exceeding its normal flow capacity. This can cause flooding in lowlands, wash away soil, damage infrastructure, and endanger the lives of humans and other living things.



**Figure 3.** Documentation when riding the Ie Raya

The community recognizes the rise of the river through a combination of management experience, natural signs, and weather patterns observed over generations. The community's benchmark for detecting the rise of the river on the mountain is changes in natural behavior, such as: cloudy skies, dark clouds, the appearance of water visible from a distance (*ule ie*), scattered dry leaves or fallen small trees, the color of the river water changing to a cloudier or darker brown, indicating a landslide upstream. The sound of rushing water is louder than usual, indicating a sudden increase in water volume or discharge. This is usually accompanied by materials such as rocks and wood. The local community is highly sensitive to weather changes. Upon further examination, the concept of *ie raya* in the Brayeun community is closely related to disaster mitigation for flash floods and overflows.

These findings align with the opinion of Puspitasari et al. (2018), who suggest that communities with a collective awareness based on local wisdom tend to be better prepared for disasters, for example by conducting early evacuation during heavy rain and maintaining river cleanliness. Furthermore, Adi (2013) stated that the signs before a flash flood are heavy rain, many fallen trees, wood being carried to the surface, higher water discharge, murky water, and the sound of roaring water. In several cases in Brayeun, unusual animal behavior, such as birds or insects descending on residential areas or restless pets, are also considered natural signs. All of these signs have been recognized for generations by the Brayeun community and have become part of local wisdom in anticipating the arrival of flash floods. Figure 4 shows documentation from when researchers interviewed several informants.

The Brayeun community considers the signs above to be warnings of impending flash floods or dangerous river overflows. Gaillard et al. (2013) state that locally based communication mechanisms have an advantage in reaching vulnerable groups, especially in remote areas lacking modern technology. The strength of this system lies in the high social trust in information from traditional elders or local figures, which strengthens the effectiveness of community-based mitigation.

Furthermore, communities also communicate verbally and quickly through kinship networks and mutual assistance, especially at night or during extreme weather. Mitchell et al. (2010) believe that in local knowledge systems, people's accumulated understanding of natural systems is usually passed on orally and cannot be explained scientifically. *Ie raya* is passed on orally in the form of stories. According to Ernawi (2010), folktales and songs are part of intangible local wisdom. The concept of *ie raya*, as a local knowledge found and believed in by the Brayeun community, when examined from the perspective of the seven elements of local wisdom, is included as part of the human knowledge system (Koentjaraningrat, 2009; Digdoyo, 2015).

Furthermore, *ie raya*, when examined from a cultural perspective, is classified as an idea (ideal form) and an activity (action) (J.J. Hoeningman in Koentjaraningrat, 2009; Sulasman and Gumilar, 2013). *Ie raya* aligns with the characteristics of local wisdom as proposed by Alwasilah (2009): it is based on past experience, has been proven to be utilized for generations, is integrated into general societal behavior patterns, is commonly used by individuals and communities, and is closely related to belief systems. *Ie Raya* has the function, purpose, and objective of mitigating flash floods and overflows, as stated (Sartini, 2004; Aminuddin, 2013). It functions for the conservation and preservation of natural resources, and serves as advice, beliefs, literature, and taboos.



**Figure 4.** Joint Documentation with Informants

Finally, *Ie Raya* is socialized informally within the community and also informally within families in Brayeun. According to Koentjaraningrat (2009:186), the socialization process is related to the learning of culture in relation to the social system. In this process, an individual, from childhood to old age, learns patterns of action in interactions with all kinds of individuals around them who occupy various social roles that may exist in everyday life.

This knowledge not only serves as an early warning system but also as part of the local culture, strengthening social solidarity in the face of the threat of natural disasters from *Ie Raya*. This

aligns with research by Adger (2000), which states that local community involvement is a key factor in building social resilience to disasters.

Furthermore, if the aforementioned signs occur, the local Brayeun community will immediately notify all visitors to the Brayeun tourist attraction to be more vigilant. Tourist guards provide warnings by blowing whistles. This early warning system encourages visitors to refrain from bathing, to maintain vigilance, and to remain alert for signs of rising water levels. Anwar et al. (2023) emphasized that combining traditional systems with modern approaches in the tourism context is highly effective for disaster risk reduction.

In the Brayeun community, *Ie Raya* occurs annually, typically during the rainy season, from November to March. During this period, rainfall tends to be high and lasts for quite a long time, especially in mountainous areas or upstream rivers that supply water to the Brayeun area. Typically, the potential for major floods peaks between December and February, when heavy rain falls almost daily and the ground begins to saturate. Typically, river levels rise quite rapidly, the flow becomes more rapid, and the community begins to become alert.

Major floods, or large-scale floods, have occurred several times, but in controlled forms and without causing flash floods. However, because the natural conditions in Brayeun are relatively well-preserved, such as dense forests and spatial planning that adheres to local wisdom, these major floods have not caused major damage. Therefore, although major floods have occurred several times, the community is accustomed to anticipating and dealing with such situations wisely. Wekke (2021) suggests the need for documentation and structured training in disaster mitigation.

Finally, the values of local wisdom include, first, the value of natural sustainability, where communities consciously maintain forests and vegetation around rivers to maintain their sustainability, thereby helping to buffer water flow and prevent erosion. Rahastri et al. (2024), where local values such as mutual cooperation, environmental conservation, and social awareness are pillars of the mitigation system. Second, the value of caution in building, is evident in the way people choose residential locations that are not too close to rivers or landslide-prone areas. Third, the value of mutual cooperation and environmental awareness, for example in maintaining the cleanliness of rivers and waterways together to prevent blockages. Fourth, spiritual values and respect for nature, where people believe that large waters have power and must be respected, thus fostering an attitude of vigilance and responsibility towards nature. These values are an important part of local wisdom that contributes to natural disaster mitigation efforts. Hoffman (2015), who emphasizes the importance of local culture and spirituality in mitigation strategies.

In terms of policy implementation, the lack of formal recognition of the *Ie Raya* system in official disaster management documents at the village and district levels presents a challenge. This situation contradicts the IFRC (2014) recommendation that encourages the recognition and integration of local wisdom into disaster risk reduction (DRR) policies. The absence of supportive regulations can lead to the marginalization of local knowledge and reduce its effectiveness in the long term.

However, formal efforts by local governments to document and adopt the local *Ie Raya* system into digital disaster mitigation platforms remain minimal. This fact contradicts the findings of Rahman et al. (2020), who emphasized the importance of digitizing local knowledge as a

means of adapting to the modern era while simultaneously preserving cultural heritage in a more sustainable form. In Brayeun, there has been no collaboration between technology institutions, academics, and local communities to archive and transform Ie Raya knowledge into learning media or early warning applications, thus leaving the enormous potential of this local wisdom underutilized.



the risk of flash floods. This aligns with the view of Nakashima et al. (2012), who stated that spirituality is often a key driver in community-based conservation practices. The belief that rivers have their own power and will makes communities more cautious and cautious in interacting with nature.

The results of this study confirm that although Ie Raya has not been fully integrated into formal disaster management systems, its values remain an important foundation for local community resilience. This conclusion aligns with the Sendai Framework study (UNDRR, 2015), which underscores the importance of local and community-based approaches in disaster risk reduction strategies. Therefore, strengthening local capacity and collaboration between traditional actors, government, and educational institutions are crucial steps to ensure the sustainability of this local wisdom.

### **Local Knowledge of Floods and Lawe Floods in Southeast Aceh Regency**

The second research location was chosen in Lawe Hijo Metuan Village, which is part of the BAMBEL District, Southeast Aceh Regency. Based on initial information, Lawe Hijo Metuan Village last experienced a flash flood in 2023. Southeast Aceh Regency was chosen to obtain data representative of central Aceh. Figure 5 shows a map of the research location in Lawe Hijo Metuan Village.

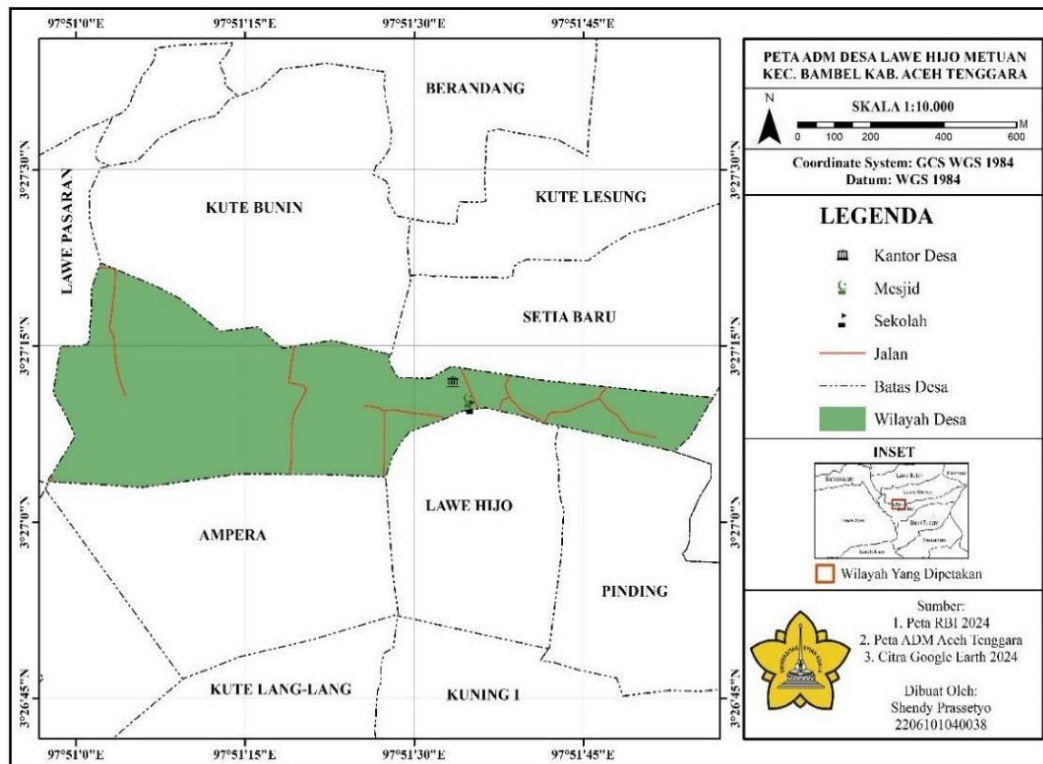
Based on interviews, the following conclusions were drawn: flash floods have become a common occurrence for the residents of Lawe Hijau Metuah Village, BAMBEL District, Southeast Aceh Regency, during the rainy season. Flash floods occur annually, sometimes even several times a year. Therefore, it is difficult to quantify the number of flash floods due to their frequency; only the location of their occurrence changes. Flash floods are a frequent natural disaster in Indonesia, especially in areas with steep topography and high rainfall. Flash floods can carry materials such as mud, rocks, and wood, causing significant damage to infrastructure and the environment (Parmelian et al., 2022).

Based on these experiences, the community already has good local knowledge regarding the characteristics of impending flash floods, such as: 1) Heavy rainfall occurs every day. 2) Rain in a short duration of approximately 2 hours in the upstream area and in residential areas, flooding is certain to occur. 3) The color of the water begins to cloudy or changes to a brownish hue. 4) The volume of water increases beyond normal conditions. 5) The smell of rotting pine trees and mud in the air around the community, these smells originate from the upstream area in the mountains and are carried to residential areas. 6) The sound of rock material being carried along with water in the river area is heard very loudly. If some of these characteristics occur in life, then the community immediately saves themselves to a safer place, to avoid becoming victims. In an emergency, residents escape to higher ground or evacuation sites provided by social services. However, some also choose to stay at home and try to save important items.

The above findings align with research by Utami and Tyas (2021). The Wana people of Central Sulawesi Province possess local knowledge of interpreting natural signs before flash floods, such as the color of river water, the sound of rocks and wood being carried by the current, and changes in animal behavior, all of which serve as early warning systems. This knowledge is not the result of formal education, but rather is acquired through collective

experience and transmitted orally from generation to generation through traditional discussions (mogombo), observation of nature, and daily life experiences.

Within the community, local knowledge about disaster mitigation is usually shared before the rainy season, as a form of anticipation and reminder to residents. This local knowledge is disseminated through community meetings in emergencies or when signs of flooding begin to appear. Information is also conveyed using loudspeakers in every meunasah (small religious building) and mosque within the community, encouraging people to prepare for flooding or flash floods.



**Figure 5.** Map of Lawe Hijo Metuah Village

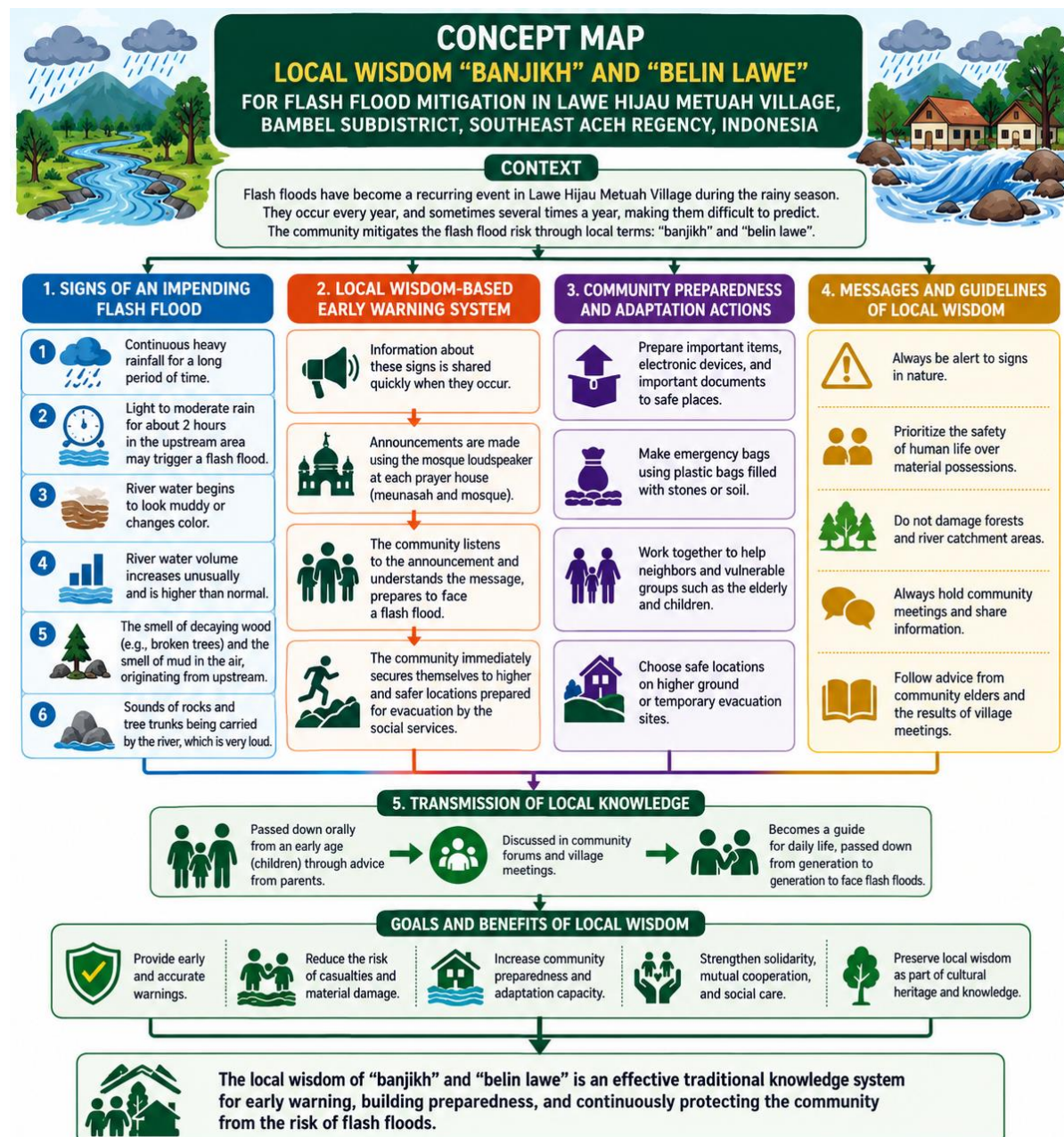
According to the community, flash floods often occur due to indiscriminate logging in upstream areas, which is further exacerbated by river silting due to material from upstream, which causes water to easily overflow into residential areas. Furthermore, high rainfall and a water level higher than residential areas make flooding more likely. This demonstrates that the forests in the upstream areas of Southeast Aceh have begun to be cleared, and that there are no community conservation efforts. Contrary to the research findings of Suparmini et al. (2014), the Baduy community, which has a forest zoning system as a form of structured conservation and mitigation, appears to lack a communally organized environmental system, beyond a reactive collective awareness of disasters.

Villagers refer to flash floods with local terms such as "banjikh" and "belin lawe." These terms demonstrate a unique form of community recognition of the type of disaster they frequently experience. The research findings of Suparmini et al. (2014) show that the Baduy community also integrates local terminology into their cultural practices, including environmental conservation and forest area division as disaster mitigation strategies.

Local knowledge is generally passed down orally from childhood through advice and warnings, both from parents and in village deliberation forums. Research by Suparmini et al.

(2014) found that the Baduy community transmits knowledge and customary rules (pikukuh) verbally through rituals and daily life, without the use of modern media (Suparmini et al., 2014). Local knowledge is passed down orally through direct experience with flooding. The people of Lawe Hijau Metuah Village, BAMBEL District, Southeast Aceh Regency, also do not know who first created this local knowledge; they only know that it has been passed down from their ancestors in previous generations.

Mitchell et al. (2010) believe that within the local knowledge system, the community's accumulated understanding of natural systems is usually passed down orally and cannot be explained scientifically. Local knowledge of banjikh and belin lawe is passed down orally in the form of stories. According to Ernawi (2010), folktales and songs are part of intangible local wisdom. The concept of banjikh and belin lawe, as local knowledge found and believed in by the Lawe Hijo Metuan community, when examined from the seven elements of local wisdom, is included as part of the human knowledge system (Koentjaraningrat, 2009; Digdoyo, 2015).



Furthermore, local knowledge of banjikh and belin lawe, when examined from a cultural perspective, is classified as an idea (ideal form) and an activity (action) (J.J. Hoeningman in Koentjaraningrat, 2009; Sulasman and Gumilar, 2013). The local knowledge of Banjikh and Belin Lawe aligns with the characteristics of local wisdom as proposed by Alwasilah (2009): based on past experience, proven to have been used for generations, integrated into general societal behavior patterns, commonly used by individuals and communities, and closely linked to belief systems. The local knowledge of Banjikh and Belin Lawe has functions, aims, and objectives for mitigating flash floods and overflow floods, as stated (Sartini, 2004; Aminuddin, 2013). It serves for the conservation and preservation of natural resources, serves as advice, beliefs, literature, and taboos.

Finally, the local knowledge of Banjikh and Belin Lawe is socialized informally within the community and also informally within families in Brayeun. According to Koentjaraningrat (2009:186), the socialization process is related to cultural learning in relation to the social system. In this process, an individual, from childhood to old age, learns patterns of behavior in interactions with all kinds of individuals around them who occupy various social roles that may arise in everyday life.

The above findings align with the research of Utami and Tyas (2021) in the Wana community of Central Sulawesi Province. Social structures such as Lipu and Opot are used as more formal and organized preparedness implementation units. The community utilizes physical preparedness practices such as Banua Dusu (emergency treetop shelters) and Tolu (bamboo riverbank reinforcement structures), demonstrating more systematic technical and ecological preparedness. Furthermore, Utami and Tyas (2021) stated that a community-based approach and local wisdom can provide a solid foundation for developing contextual and sustainable disaster risk reduction strategies.

This suggests that disaster mitigation culture is primarily verbal and informally passed down. Furthermore, the community has several important messages to use as guidelines during flash floods, such as moving electronics and important documents to a safe place and building emergency embankments using sacks filled with rocks or soil. Although simple, these actions reflect functional local wisdom, just as the Baduy people build disaster-resistant houses from natural materials and follow the contours of the land to avoid the risk of earthquakes and flooding (Suparmini et al., 2014).



**Figure 6.** Corn fields of the community affected by flooding



**Figure 7.** SMAN 1 Babel which was affected by the flash flood disaster

This message was not documented in written form, but rather memorized and practiced. This knowledge is thought to have developed naturally in response to environmental conditions frequently impacted by flooding and passed down from previous generations. According to research by Suparmini et al. (2014), the Baduy people possess the ability to recognize natural phenomena and adapt their behavior based on inherited ecological experiences.

When a flash flood occurs, the community is gripped by panic, and many public facilities and homes are damaged by flood debris, such as mud and rocks carried by the current. After the flood, the community begins cleaning their homes and the surrounding environment of the debris. To date, there have been no fatalities in the community; only evidence of the flash flood remains can be seen in the form of remaining flood debris, watercourses, and damaged buildings. Figures 6 and 7 show the impact of the December 2023 flash flood disaster.

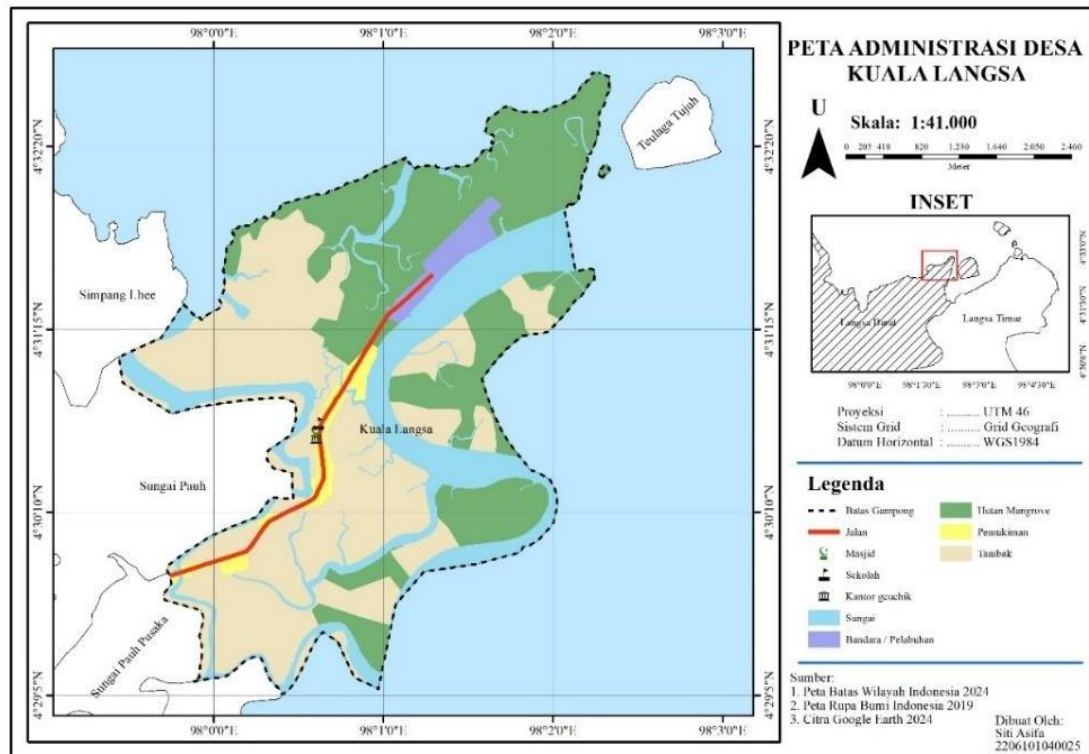
Research by Prastyo et al. (2022) found that traditional communities, such as those in Rahtawu Village, apply local wisdom to deal with flash floods by maintaining ecosystem balance through earth alms rituals and land zoning systems. They also have an early warning system based on local wisdom that helps reduce the risk of disaster impacts on their lives. Good environmental management and the application of local wisdom in nature conservation are key to flash flood prevention and mitigation.

The entire community of Lawe Hijau Metuah Village, BAMBEL District, Southeast Aceh Regency, understands flash flood mitigation methods based on local knowledge. This has become part of a collective tradition that is passed down and practiced together. Furthermore, other communities in Southeast Aceh who live in areas prone to flash floods are also beginning to recognize and understand this local knowledge of flash flood mitigation. There are no sanctions or punishments for those who do not understand this local knowledge, as it is more of a collective awareness than a formal regulation.

### **Ie Tuara Local Knowledge in Kuala Langsa, Langsa City**

The third research location was chosen in Kuala Langsa Village, which is part of the West Langsa District of Langsa City. Based on initial information, Kuala Langsa is home to the Ie Tuara Local Knowledge. Langsa City was chosen to collect data representing North and East Aceh. Figure 8, a map of the research location in Kuala Langsa Village, is shown below.

Based on interviews with residents in Kuala Langsa, the following findings were obtained: Ie Tuara is located in a coastal area synonymous with saltwater. Ie Tuara is the largest body of water at the end of the year, and it rises to the surface every year. Almost every rainy season or high tide, the Ie Tuara rises. The Ie Tuara usually begins to rise between October and December, due to the rainy season and frequent high tides.



**Figure 8.** Map of Kuala Langsa

Ie Tuara is a term in the local wisdom of the Acehne people that refers to the traditional water management and utilization system, particularly in the lives of coastal communities. Literally, in the Acehne language, "Ie" means water and "Tuara" means flowing. This concept reflects how the Acehne people understand, manage, and adapt to the dynamics of water resources, both for daily life, agriculture, fisheries, and disaster mitigation such as tidal flooding (Hasan, 2018).

Signs preceding the arrival of tidal floods include the approaching rainy season and continuous rain for several days, indicating that tidal floods will rise to the surface. High tides often indicate tidal floods. The worst tidal floods occurred in 2002, and they are currently less severe than before. The causes of tidal flooding are believed to be due to high rainfall and rising sea levels inland. (Metro Post, 2011)

Local plants and vegetation can help prevent or mitigate the impact of tidal flooding in the coastal areas of Kuala Langsa, such as mangroves, which prevent seawater from directly inundating the land. The function of mangroves is to prevent coastal abrasion, as their roots spread widely and firmly hold the soil. The story of Ie Tuara is passed down orally from generation to generation in the Kuala Langsa community. To this day, the younger generation in Kuala Langsa still knows and understands the phenomenon of Ie Tuara, thus preserving this local knowledge.

Mitchell et al. (2010) believe that within local knowledge systems, people's collective understanding of natural systems is typically transmitted orally and cannot be explained scientifically. Local knowledge, known as Ie tuara, is transmitted orally in the form of stories. According to Ernawi (2010), folktales and songs are part of intangible local wisdom. The concept of Ie tuara, as local knowledge found and believed in by the Kuala Langsa community,

when examined from the seven elements of local wisdom, is included as part of the human knowledge system (Koentjaraningrat, 2009; Digdoyo, 2015).

Furthermore, when examined from a cultural perspective, *Ie tuara* is classified as an idea (ideal form) and an activity (action) (J.J. Hoeningman in Koentjaraningrat, 2009; Sulasman and Gumilar, 2013). *Ie tuara* aligns with the characteristics of local wisdom as outlined by Alwasilah (2009): based on past experience, proven to have been used for generations, integrated into general societal behavior patterns, commonly used by individuals and communities, and closely linked to belief systems. *Ie tuara* has functions, aims, and objectives for tidal flood mitigation, as stated (Sartini, 2004; Aminuddin, 2013). It functions for the conservation and preservation of natural resources, and serves as advice, beliefs, literature, and taboos.

Finally, *ie tuara* is socialized informally within the community and also informally within families in Kuala Langsa. According to Koentjaraningrat (2009:186), the socialization process is related to cultural learning in relation to the social system. In this process, an individual, from childhood to old age, learns patterns of action in interactions with all kinds of individuals around them who occupy various social roles that may exist in everyday life. Traditional early warning systems prior to tidal flooding typically focus on natural signs, such as high tides or stronger-than-usual winds from the sea, and changes in the weather. When this happens, people begin to remove belongings from the floors of their homes, especially if their homes are low-lying or close to the coast. Kamasuta et al. (2021) emphasize the crucial role of indigenous communities in disaster mitigation, particularly in maintaining proven effective local practices.

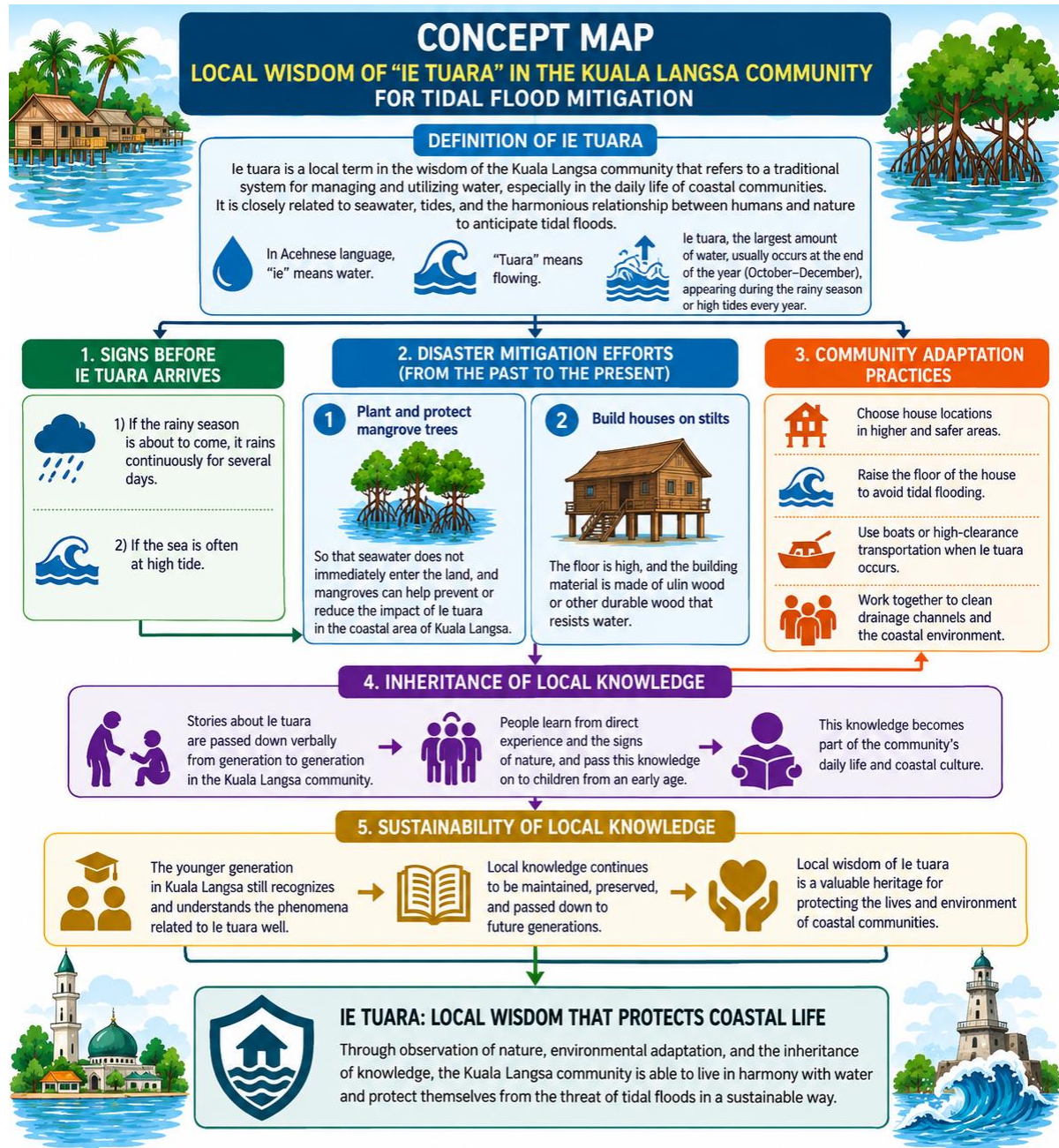
The detrimental impacts of tidal floods in Kuala Langsa include seawater entering homes, damaging floors, damaging electronic equipment, and causing losses due to fish being swept away in ponds, as well as breaking pond barriers. Furthermore, tidal floods pollute the environment, killing numerous mangrove seedlings, contaminating the soil, making residents' wells salty, and carrying large amounts of mud and debris. Furthermore, people do not complain when tidal floods occur and simply wait for the water to recede. No specific actions are taken to prevent tidal floods. Sukma et al. (2024) showed that a local wisdom-based mitigation approach would be more easily accepted by the community because it aligned with their cultural values and historical experiences. Figure 9 shows documentation from when researchers interviewed informants.



**Figure 9.** Informant being interviewed by the researcher

*Ie tuara* is a term used in the local wisdom of the Acehese people, particularly in coastal areas like Kuala Langsa, which refers to a traditional water management system. This concept relates to how communities have traditionally utilized water resources for daily life, agriculture, and disaster mitigation such as tidal flooding. The values embodied in *ie tuara*

include the principles of sustainability, mutual cooperation, and environmental adaptation, which help communities cope with natural and climate change. A community-based approach and the integration of local values are crucial in community-based disaster mitigation strategies (Surya & Fitriani, 2020).



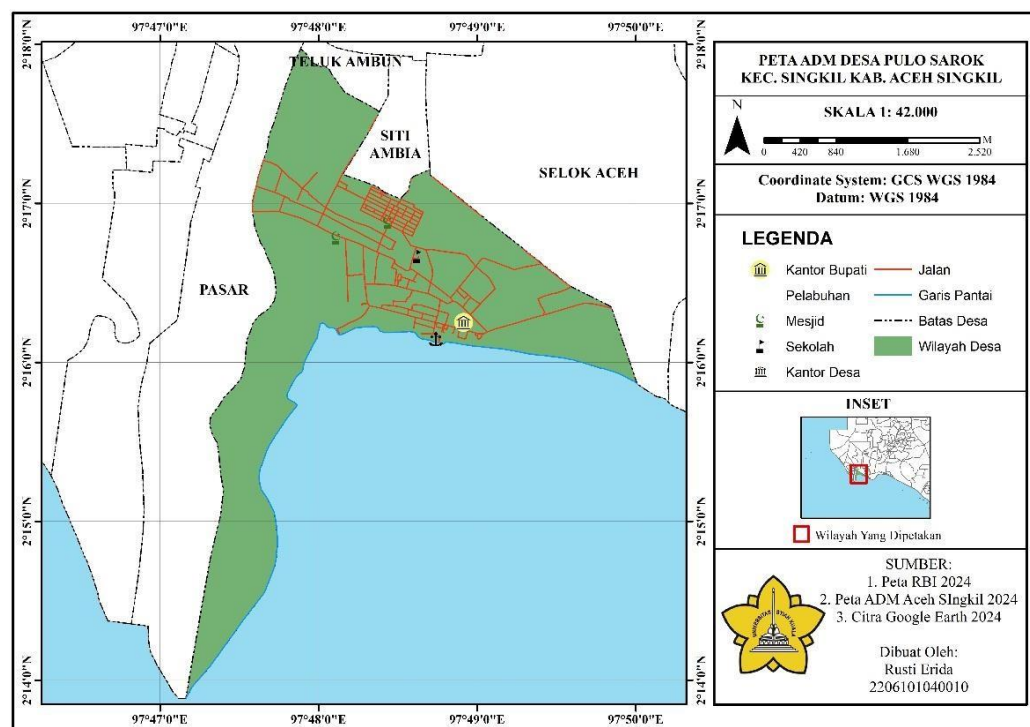
Structurally, building sea walls, raising roads, and improving drainage systems are technical solutions to retain and redirect seawater inflow (Rahmawati, 2021). Disaster mitigation efforts undertaken by the Kuala Langsa community, from the past to the present, have consisted of building stilt houses with raised floors and using ironwood or other strong, water-resistant woods. Maintaining mangrove vegetation and paying attention to natural signs are concrete forms of adaptation strategies passed down from previous generations. This aligns with Keraf's (2010) opinion, which states that local wisdom serves as a guide for communities in adapting to environmental challenges. In this context, adaptive practices such as building stilt

houses and preserving mangroves demonstrate the close link between traditional knowledge and locally based disaster mitigation strategies.

### Local knowledge of the "Belen Lae" flood in Aceh Singkil (Case Study in Rawa Singkil, Pulo Sarok Village)

The fourth research location was selected in Pulo Sarok Village, which is part of Singkil District, Aceh Singkil Regency. Based on preliminary information, Kuala Langsa has local knowledge for flood disaster mitigation. Aceh Singkil Regency was chosen to obtain data representative of Southwest Aceh. Figure 10 shows a map of the research location in Pulo Sarok Village.

Based on the results of interviews with the community in the Rawa Aceh Singkil area, the results obtained are: In the Rawa Singkil community of Pulo Sarok Village, the term flood is known as "Belen Lae", the community has started living in the Rawa Singkil area since 2002, and based on community experience, flooding occurs in Rawa Singkil at least once and has also occurred two to three times in one year. The main cause of flooding in the Rawa Singkil area is heavy rain that does not stop for days in the upstream area, which then the water will flow downstream or swamp areas so that it inundates residents' settlements. The community's response when facing flooding is normal, because people think flooding is a common thing and what they do when a flood occurs is packing and preparing to move things to a safer place. However, there are also some Rawa Singkil residents who feel panicked when flooding occurs.



**Figure 10.** Map of Pulo Sarok

Ta'adi et al. (2023) stated that preparedness is crucial because it determines the resilience of community members in the face of a disaster. People no longer view flooding as a surprise, but rather as a routine phenomenon that must be addressed with organized preparation and strategies, albeit still traditional and simple. The community believes in the signs preceding a flood, usually heavy rain that continues for days and flooding in upstream areas during the

rainy season. The Rawa Singkil community sees signs such as dark clouds from upstream and changes in the color of the river water, which becomes cloudy. According to research by Haliadi et al. (2023), forms of disaster mitigation in Kaliburu Kata Village involve observing signs given by nature through certain plants and animals, which are believed to be signs of an impending disaster. The community's preparations before a flood include preparing everything needed during a flood, such as planks for platforms and bridges, and boats.

Then, during a flood, the community cleans up any trash carried by the current and evacuates items vulnerable to water, then lifts them onto the platforms they have prepared. After a flood, people clean their yards, clean up floodwaters or debris carried by the current, and clean the drains around their homes. However, some informants did not take any action to mitigate the flood disaster. Research by Yulantri et al. (2023) found that flood disasters are influenced by natural factors such as rainfall and physiography, as well as non-natural factors such as land use, infrastructure conditions, and human activity as the dominant causes of flooding. Figure 12 shows the results of the researcher's documentation during interviews with informants.

The level of damage to infrastructure (houses, roads, and bridges) caused by flooding in the Rawa Singkil area, including bridges, roads, and houses, was high due to numerous potholes, collapsed bridges, and rotting house planks due to the high intensity of the floodwaters. Access to health services was not disrupted during the flood, and health posts were even established. However, access to education was severely disrupted. Schools were unable to attend school as usual, and schools were even closed due to the heavy flooding. Access to education remained open, but access to locations was somewhat difficult.



**Figure 11.** Stilt House



**Figure 12.** Researcher with Informant

The flooding also significantly impacted agriculture, with crops failing, trees rotting, and seedlings dying, resulting in losses for the local community. Flooding also impacted economic sustainability, as the community's economy was disrupted during the flood, as they were unable to engage in any activities to meet their daily needs. However, some residents felt that economic sustainability was not affected, as they could meet their daily needs by fishing during the flood and other activities such as providing ferry services by boat or raft. Communities adapt physically, economically, and socially, including diversifying their jobs and leveraging social relationships to maintain their livelihoods (Asrofi et al. 2017).

Rasyid and Suhaeb (2023) found that the annual flooding in Suli Village has led to community adaptations. The residents of Suli Village are accustomed to flooding and know what to do to cope. Similarly, the residents of Rawa Singkil have no plans to move to another area and prefer to remain, even though flooding occurs annually. These include a lack of funds to relocate, a lack of knowledge of where to move, as building or purchasing land elsewhere would be prohibitively expensive, and the land is inherited or inherited, as well as a well-established livelihood in the area. Therefore, if they were to relocate, it would be difficult for them to adapt and find a new livelihood.

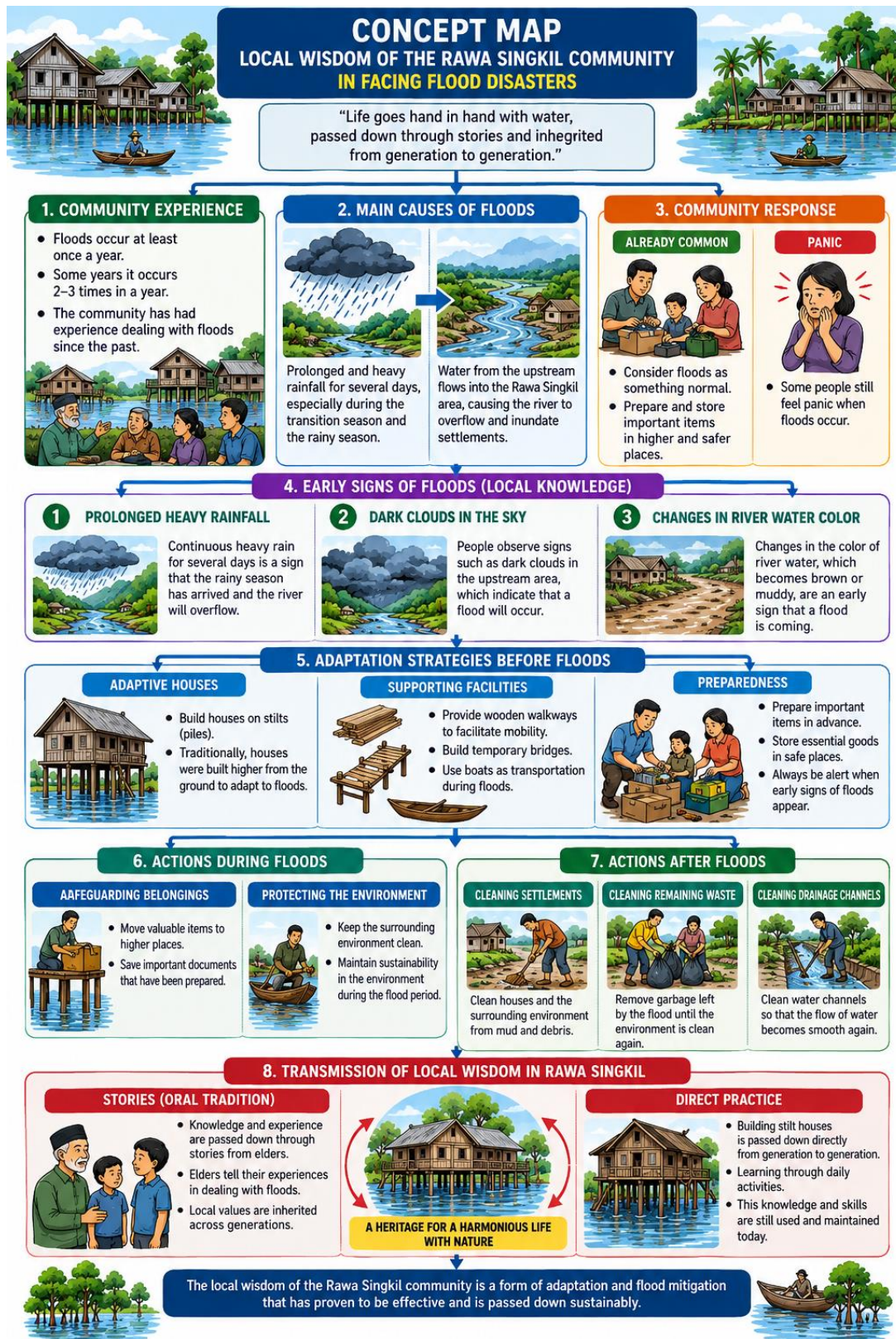
In accordance with the research of Sirait, et al (2025) stated that the decision of people to remain in flood-prone areas is influenced by various factors, including emotional attachment to inherited family homes, strong social ties with the surrounding environment, and economic limitations that make it difficult for them to move to safer places. Then, the role of local customs or beliefs in flood disaster mitigation is very large, so that it helps in surviving when floods occur, and reduces the risk of damage when floods occur. The results of this study are in line with the opinion of Dyah, et al (2024) local wisdom, which includes values, traditions, and inherited knowledge, plays an important role in flood disaster mitigation in various regions.

In addition to the various local knowledge mentioned above, one form of local wisdom still applied in disaster mitigation in the Rawa Singkil community is building houses with high foundations, or stilt houses, and providing planks to create platforms during floods. This practice has been practiced since ancient times to the present day. The documentation of stilt houses built by the Rawa Singkil community is also presented in Figure 11 above. According to research by Rusmaniah et al. (2025), building flood-resistant houses is another effort undertaken by the community in Sungai Tabuk District to minimize the impact of flood damage.

Various forms of local knowledge in the Rawa Singkil community are conveyed orally through stories and hands-on activities such as building stilt houses with the community. Mitchell et al. (2010) believe that within the local knowledge system, the community's accumulated understanding of natural systems is usually passed on orally and cannot be explained in scientific terms. Local knowledge of flood disaster mitigation is passed on orally in the form of stories, according to Ernawi (2010) folk stories and songs are part of intangible local wisdom while direct activities of making stilt houses with the community according to Ernawi (2010) tangible forms of local wisdom include the following aspects: textual, buildings/architecture, cultural heritage objects, because they are concretely tangible in the form of objects (which can be seen, touched and felt). Local knowledge of flood disaster mitigation that exists and is believed by the Rawa Singkil community is included in the elements of the human knowledge system while building stilt houses is part of the equipment and supplies of life/technology, specifically in the shelter and housing section if examined from the seven elements of local wisdom (Koentjaraningrat, 2009; Digdoyo, 2015).

Furthermore, local knowledge of flood disaster mitigation, when examined from a cultural perspective, is classified as an idea (ideal form) and an activity (action). Building a stilt house is part of an artifact (work) (J.J. Hoeningman in Koentjaraningrat, 2009; Sulasman and Gumilar, 2013). Local knowledge of flood disaster mitigation aligns with the characteristics of local wisdom as stated by Alwasilah (2009), namely based on past experience, proven to

have been used for generations, integrated into general community behavior patterns, commonly used by individuals and communities in general, and closely related to belief systems. Local knowledge of flood disaster mitigation has functions, aims, and objectives for flood disaster mitigation as stated (Sartini, 2004; Aminuddin, 2013) functioning for the conservation and preservation of natural resources, functioning as advice, beliefs, literature, and taboos.

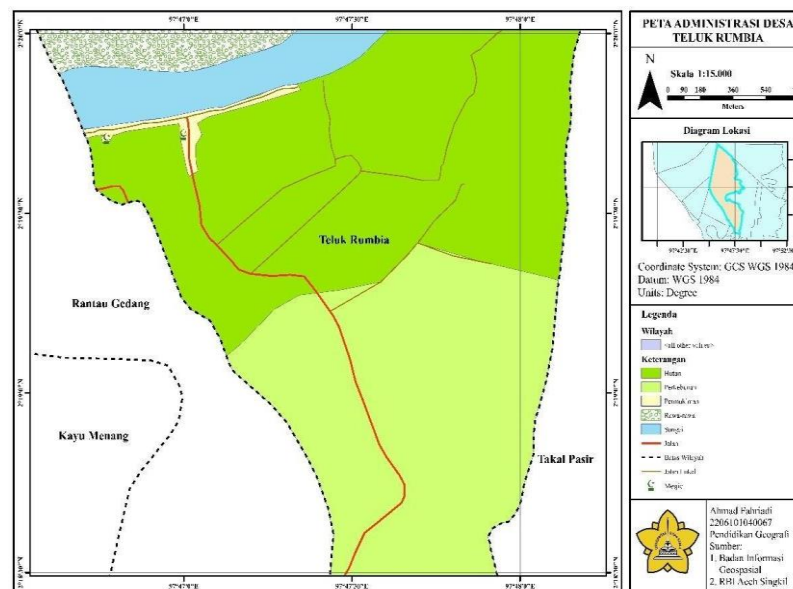


Finally, local knowledge of flood mitigation is disseminated informally within the community and informally within families in Rawa Singkil. According to Koentjaraningrat (2009:186), the socialization process is related to cultural learning within the social system. In this process, an individual, from childhood to old age, learns patterns of behavior in interactions with all kinds of individuals around them who occupy various social roles that may arise in daily life.

Social relations between residents during a flood become closer, and people help each other or work together as a form of solidarity or mutual assistance. For example, helping residents whose homes are severely affected by flooding due to lower-rise buildings, the community will work together to evacuate affected residents to safer locations or higher-rise homes. Finally, there are no customary rules governing residential spatial planning and environmental management in the Rawa Singkil area to reduce flood risk. Residents are free to build or manage residential spatial planning as long as the land belongs to the community itself and not to others.

### Local Flood Knowledge in Aceh Singkil (Case Study in Rumbia Bay)

Based on interviews with the community in Rumbia Bay, Aceh Singkil, the following findings were obtained: The existence of indigenous communities in the Rumbia Bay region has existed since the time of their ancestors, and the community interacts directly with the forests and swamps as part of their daily lives and is considered an ancestral heritage. Rahayu et al. (2019) stated that local wisdom is the result of human adaptation to the environment, passed down from generation to generation. The people of Rumbia Bay believe that protecting nature is both a spiritual and cultural obligation. They already understand the importance of preserving nature because forests are considered a source of livelihood and part of their cultural identity.



**Figure 13.** Map of Teluk Rumbia Village

Local wisdom that is still practiced includes a prohibition on indiscriminately cutting down large trees, a prohibition on hunting during the breeding season, the use of forest products in moderation, and the tradition of replanting trees after harvest. Community customs include using natural resources wisely, protecting swamps from waste, and implementing customary rules when clearing new land, as well as a rotation system for harvesting forest products. Some

villages still maintain the tradition of "selamatan" (forest feast) or "kenduri hutan" (forest feast) as an expression of gratitude to nature.

The use of forests and swamps is regulated by customary law, including rules such as prohibiting unauthorized entry into sacred areas and prohibiting indiscriminate land burning. All utilization activities must be conducted through consultation between residents and traditional leaders, and with the permission of the traditional leader or village leader. Violations of these rules are usually subject to customary sanctions. Communities are prohibited from harvesting large quantities of forest products or using chemicals. All activities are conducted traditionally and take into account the balance of nature. As explained by Hidayat and Ardiansyah (2022), indigenous communities possess local ecological knowledge systems that can strengthen conservation strategies at the grassroots level.

Furthermore, indigenous communities maintain forest and swamp ecosystems through various efforts, such as reforestation, or replanting trees in deforested areas, such as nipa palms, sago palms, and other swamp plants; community cooperation in clearing swamps and clearing river flow obstructions; joint monitoring; and the prohibition of using fire to clear land. Communities also regulate planting patterns to maintain soil fertility and prevent rapid deterioration. Finally, communities educate children from an early age about the importance of environmental protection.

Indigenous communities regulate the use of forest products to ensure sustainability through selective and seasonal use. Harvesting of forest products such as rattan, resin, and honey is carried out according to customary schedules and village deliberations. Each community is given limits on harvesting natural resources to prevent overexploitation. For example, each family has an agreed-upon portion of forest products. For example, forest honey is harvested only after the flowering season, and communities use natural signs to determine harvest times. This maintains a balanced ecosystem.

Sanctions apply to violators of customary rules regarding forest and swamp utilization. Violators of customary rules are subject to fines, including the loss of harvested crops, social sanctions such as exclusion from village activities, community apologies, and even temporary ostracism. In serious cases, violators can be reported to the authorities. Customary deliberations serve as a forum for resolving violations and providing guidance to violators. Communities emphasize the importance of enforcing customary law to maintain environmental conservation.

Indigenous communities prevent forest and swamp destruction due to human activity, including by installing prohibition signs in areas deemed vulnerable and forming village monitoring groups. They also coordinate with village officials if suspicious activity occurs from outside parties. Residents conduct joint patrols, environmental awareness campaigns, and village meetings to prevent illegal logging and land conversion. Some villages collaborate with NGOs and the village government in environmental monitoring and conservation activities. Damanik (2015) states that synergy between the village government, the community, and non-governmental organizations is crucial to supporting community-based conservation.

Certain rituals or traditions are performed as a form of respect for nature, such as the forest feast, a common expression of gratitude for the blessings of nature. Before planting or clearing

land, communities hold communal prayers to avoid danger and achieve good harvests, as well as to celebrate the harvest season. There are also customary prohibitions, such as prohibiting women from entering the forest at certain times. These traditions serve as a form of respect for the forest's guardian spirits and a symbol of ecological awareness. Yuliani et al. (2018) state that a community-based restorative approach has proven effective because it is tailored to the needs and conditions of the local community.

Mitchell et al. (2010) believe that within local knowledge systems, people's understanding of natural systems is typically passed down orally and cannot be explained scientifically. Local knowledge for flood disaster mitigation, as mentioned above, is passed down from one generation to the next orally in the form of stories. According to Ernawi (2010), folktales and songs are part of intangible local wisdom. Local knowledge for flood disaster mitigation, as a local knowledge found and believed in by the Teluk Rumbia community, when examined from the seven elements of local wisdom, is included as part of the human knowledge system (Koentjaraningrat, 2009; Digdoyo, 2015).



**Figure 14.** Researcher During Interview with Informant

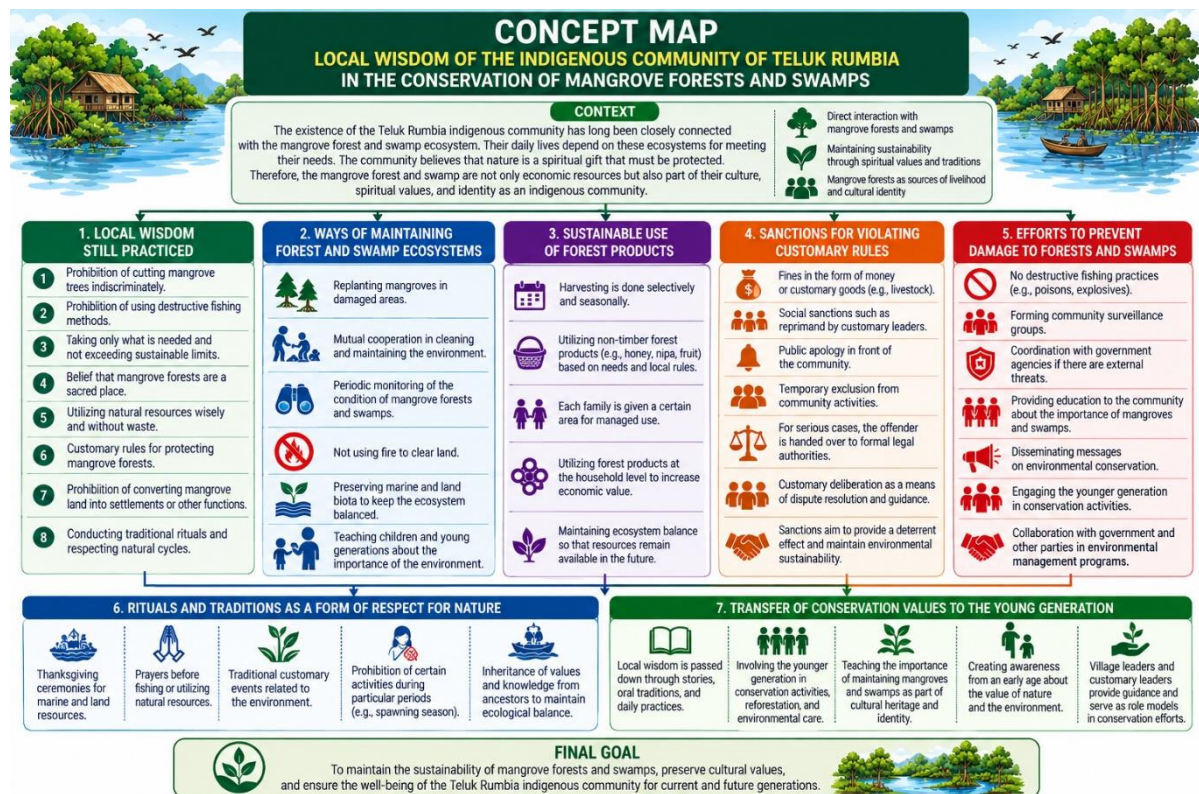


**Figure 15.** Researcher During Interview with Informant

Furthermore, local knowledge for flood disaster mitigation, when examined from a cultural perspective, is categorized as ideas (ideal forms) and activities (actions) (J.J. Hoeningman in Koentjaraningrat, 2009; Sulasman and Gumilar, 2013). Local knowledge for flood disaster mitigation aligns with the characteristics of local wisdom as stated by Alwasilah (2009): it is based on past experience, has been proven to be used for generations, is integrated into general societal behavior patterns, is commonly used by individuals and communities, and is closely related to belief systems. Local knowledge for flood disaster mitigation has functions, aims, and objectives for flood mitigation, as stated (Sartini, 2004; Aminuddin, 2013). It serves to conserve and preserve natural resources, and serves as advice, beliefs, literature, and taboos.

Finally, local knowledge for flood disaster mitigation is socialized informally within the community and also informally within families in Teluk Rumbia. According to Koentjaraningrat (2009:186), the socialization process is related to cultural learning in relation to the social system. In this process, an individual, from childhood to old age, learns patterns of action in interactions with all kinds of individuals around them who occupy various social roles that may exist in everyday life.

Indigenous communities instill conservation values in the younger generation through folklore, involving children in traditional activities, tree planting, and training in plant identification and customary rules. Young people are encouraged to actively participate in protecting their villages and the environment. These values are passed down through family education and field activities. Children are encouraged to clean rivers, plant trees, and learn about protected plants and animals. Village heads emphasize the importance of direct youth involvement in traditional activities.



Sirait (2020) emphasized the importance of legal protection for customary territories so that communities can defend their rights to a healthy environment. Indigenous communities' expectations of the government in supporting forest and swamp conservation include legal recognition of customary territories, financial assistance and conservation programs, and community involvement in ecotourism development and environmental management. They also request stricter law enforcement against environmental violations. Regulatory support at the district level is essential to ensure sustainable conservation. Sitorus and Manik (2021) explain that without regulatory support and the integration of local wisdom into education, culture-based conservation values will be eroded by the tide of globalization.

The best way to maintain local wisdom and ensure its relevance in preserving the environment is through the involvement of the younger generation, documentation of traditions,

strengthening village deliberations, and developing ecotourism. Several informants stated that combining local knowledge and academic knowledge would be an effective strategy in maintaining traditional traditions for environmental preservation. The Village Head suggested that traditional values be incorporated into the local school curriculum and that a cultural preservation community be formed. This way, local wisdom would not only be passed down but also be put into practice by the younger generation. Anwar et al. (2017) emphasized that education based on local culture can be an effective way to foster environmental awareness among the younger generation.

#### 4. CONCLUSION

Based on the research findings, it can be concluded that the local wisdom of the Acehese people plays a crucial role in community-based disaster mitigation. Local wisdom concepts such as *ie raya* and *ie tuara*, alongside the knowledge held by communities in Lawe Hijau Metuah and Rawa Singkil, demonstrate the community's ability to recognize natural signs preceding flash floods, river overflows, and tidal floods. This knowledge encompasses observations of rainfall, changes in river water color and flow rate, cloud conditions, animal behavior, the sound of flowing water, and surrounding environmental conditions; these observations serve as an early warning system and a basis for taking life-saving actions.

Furthermore, the community employs various adaptation and mitigation practices, such as constructing stilt houses, establishing evacuation facilities, safeguarding valuable assets, planting and maintaining mangroves, and managing forests and wetlands in accordance with customary rules. This knowledge and these practices are passed down orally through families, community leaders, communal deliberations, and direct intergenerational practice. These findings indicate that local wisdom serves not only as cultural heritage but also as a form of traditional ecological knowledge that contributes to disaster risk reduction, environmental management, and the strengthening of community resilience. Therefore, this local wisdom needs to be preserved, documented, and integrated into disaster mitigation strategies and context-specific disaster education.

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