YANGON UNIVERSITY OF ECONOMICS
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ASSESSMENT OF COMMUNITY AWARENESS ON DISASTER MANAGEMENT IN ANNUAL FLOOD-PRONE AREAS (A CASE STUDY OF HLAING BWE TOWNSHIP)

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MDevS – 23 (18th BATCH)

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A thesis submitted as a partial fulfillment towards the requirement for the degree of Master of Development Studies (MDevS)

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This is to certify that this thesis entitled **"Assessment of Community Awareness on Disaster Management in Annual Flood-Prone Areas (A Case Study of Hlaing Bwe Township)"**, submitted as a partial fulfillment towards the requirements for the degree of Master of Development Studies has been accepted by the Board of Examiners.

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ABSTRACT

This study aims to assess the level of community awareness and preparedness for disaster management in Hlaing Bwe Township, a region frequently affected by annual flooding. The objectives of the study are to identify the disaster management plan on annual flood-prone areas and to assess the level of community awareness on disaster management in Hlaing Bwe Township. The research focuses on understanding local knowledge, attitudes, and practices regarding flood-related risks and emergency responses. Using a mixed-methods approach, data were collected through structured questionnaires, key informant interviews, and field observations. The findings indicate that while residents are generally aware of the recurring nature of floods, there is a significant gap in formal disaster preparedness and risk reduction strategies. Most community members rely on traditional knowledge and informal communication networks during flood events. However, limited access to early warning systems, inadequate infrastructure, and lack of training in disaster response contribute to heightened vulnerability. The study underscores the importance of community-based disaster risk reduction programs, enhanced public education, and the integration of local knowledge with institutional support. Strengthening disaster preparedness in Hlaing Bwe Township requires collaborative efforts among government authorities, NGOs, and local communities to build resilience and minimize flood-related impacts.

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LIST OF ABBREVIATIONS

ADB	Asia Development Bank
CBDRM	Community-Based Disaster Risk Management
DRM	Disaster Risk Management
DRMC	Disaster Risk Management Committee
DRR	Disaster Risk Reduction
FAO	Food and Agriculture Organization
IFRC	International Federation of Red Cross
INGOs	International Non-governmental Organizations
JICA	Japan International Cooperation Agency
MSWRR	Ministry of Social Welfare, Relief and Resettlement
MUDRA	Myanmar Unified platform for Disaster Risk Application
NGOs	Non-governmental Organizations
TDMP	Township Disaster Management Plan
TDPC	Township Disaster Preparedness Committee
UNDP	United Nation Development Program
UNISDR	United Nations International Strategy for Disaster Reduction

CHAPTER I
INTRODUCTION

1.1 Rationale of the Study

Flooding is one of the most frequent and destructive natural disasters globally, accounting for approximately forty percentage of all natural disasters. Climate change amplifies its frequency and intensity. Floods rank among the most devastating natural disasters worldwide, inflicting substantial harm to both individuals and ecosystems (Zhu et al. 2024). Flooding occurs when inland or tidal waters overflow or surface waters from any source land rapidly accumulate or discharge, inundating typically dry areas (Sharma, 2000). The consequences of flooding include severe damage to homes, farms, livestock, poultry, and other agricultural resources, as well as disruptions to transportation and communication systems (Parvin et al. 2023). Additionally, the interplay of socioeconomic development and climate change is expected to worsen flooding risks in the future (Bubeck et al. 2012).

The floods in Myanmar primarily occur during the monsoon season, which spans from June to October. These floods can be broadly categorized into two types: widespread floods and flash floods. Widespread floods predominantly affect areas along major rivers like the Ayeyarwady, Chindwin, Sittaung, and Thanlwin. In contrast, flash floods typically occur in smaller rivers and streams. The primary driver of widespread floods is significant rainfall in the headwater regions lasting one to three days. This sustained heavy rainfall creates a flood wave that travels downstream, inundating areas along the river, including delta regions. On the other hand, flash floods are triggered by intense rainfall occurring in the immediate upstream area, causing floodwaters to rush downstream rapidly.

The increasing frequency and intensity of natural disasters, particularly floods, pose significant challenges to communities worldwide, including those in Hlaing Bwe Township, Kayin State, Myanmar. This township is characterized by its susceptibility to flooding, which can lead to devastating impacts on lives, livelihoods, and infrastructure. Understanding the community's awareness of disaster management

practices is essential to mitigate these risks effectively. Hlaing Bwe Township faces recurring annual floods that disrupt lives, damage infrastructure, and strain resources, despite ongoing disaster management efforts. Current strategies often rely on standardized, top-down approaches that do not fully address the region's unique socio-cultural, economic, and environmental conditions, leading to less effective responses and missed opportunities to leverage valuable local knowledge. This study aims to fill this gap by identifying and analyzing local knowledge used in Hlaing Bwe Township for flood management, evaluating its effectiveness, and proposing recommendations for its integration into institutional frameworks.

This study is essential for understanding the current levels of community awareness regarding disaster management in Hlaing Bwe Township. This township is one of seven in Kayin State's Hpa And district and is located in a low-lying plain shaped like a frying pan and zigzagged by Thanlwin, Hlaing Bwe, Maepa, and Tahpan rivers, causing annual floods. Floods harm infrastructure, affect livelihoods, and pose health problems. Despite these challenges, local communities in Hlaing Bwe Township have developed traditional practices and knowledge to prepare for and respond to floods. Communities that are better equipped to handle disasters can contribute to the overall stability and growth of the region, reducing the long-term socioeconomic impacts of flooding. This study is providing insights into the current state of awareness and inform the development of targeted educational programs and resources. The findings of this study are valuable for local authorities and policymakers in designing and implementing disaster management plans that are tailored to the specific needs and contexts of the communities in Hlaing Bwe Township.

1.2 Objectives of the Study

The objectives of the study are to identify the implementation of disaster management plan on annual flood-prone areas and to assess the level of community awareness on disaster management in Hlaing Bwe Township.

1.3 Method of Study

This study utilizes a descriptive analysis approach, incorporating both primary and secondary data. Primary data is collected from 200 residents of Hlaing Bwe Township. In addition, the selection of participants is employed a random sampling method, which could lead to some bias, as it does not guarantee that the sample

accurately represents the broader population of Hlaing Bwe Township. The secondary data is sourced from government reports concerning Hlaing Bwe Township and relevant academic literature on flood management.

1.4 Scope and Limitation of the Study

The survey includes 200 people from four wards and four villages in Kayin State's Hlaing Bwe Township. The survey sample includes 25 households from 625 households in Ward (A), 25 households from 600 households in Ward (B), 25 households from 600 households in Ward (C), 25 households from 615 households in Ward (D), 25 households from 324 households in Shwe Gun Village, 25 households from 320 households in Hti Lone Village, and 25 households from 328 households in Ward Paing Kyone Village. A survey is conducted in April and May 2025. The Ministry of Social Welfare, Relief, and Resettlement provided 2015–2024 data for the study. This thorough data helps evaluate existing disaster management measures, infrastructure development, and community understanding of Hlaing Bwe Township's goals.

1.5 Organization of the Study

Five chapters comprise the study. Chapter 1 introduces the study's premise, objectives, method, scope, limits, and organization. Chapter 2 reviews community awareness in disaster management and past research. Chapter 3 examines Kayin State catastrophe risk and preparation. Chapter 4 examines survey data. Chapter 5 highlights critical results and recommendations.

CHAPTER II
LITERATURE REVIEW

2.1 Importance of Community Awareness in Disaster Management

Disaster management involves a comprehensive approach that involves developing policies to minimize disaster risks, engaging in prevention efforts, providing effective emergency responses, and facilitating rehabilitation. The ultimate goal is to lower potential losses from hazards, ensure swift and suitable aid to disaster victims, and enable quick and efficient recovery (Khan et al., 2008). Education on disaster preparedness and emergency response plays a vital role in this framework (Torani, 2019). It is essential to take appropriate actions at every stage of disaster management to enhance overall readiness.

Community members are often the first to face and respond to disasters. It is crucial to shift the approach towards disaster mitigation, emphasizing prevention at the community level, particularly in areas that are vulnerable to disasters (Hossain, 2012). Since communities form the foundation of society, community-based disaster management should serve as the cornerstone of our overall disaster management strategy (Zhang, 2013). The goals of such management include raising public awareness and preparedness, enhancing the community's resilience through collaboration with relevant organizations, and promoting education about disasters while emphasizing the importance of preventing human-made catastrophes.

Community involvement in the disaster management cycle is crucial, stretching from the initial phases all the way to achieving and institutionalizing effective practices (Jahangiri et al., 2011). Local communities have an intimate understanding of their environments, enabling them to recognize and address vulnerability issues more effectively (Ali et al., 2019). Disaster risk management emphasizes disaster awareness and readiness to reduce their effects and forecast and avoid them. Disaster preparation involves planning and implementing practical measures to anticipate and address calamities (Kapucu, 2008).

Community awareness is a fundamental component of disaster management, especially in flood-prone areas. The role of community knowledge in disaster preparedness, response, and recovery has been widely acknowledged. Effective disaster management plans depend not only on the technical aspects, such as infrastructure and resources but also on the active participation of the community. Community awareness enhances resilience by empowering individuals to make informed decisions during emergencies, such as floods. The importance of awareness lies in its capacity to reduce casualties and property damage by ensuring that individuals are familiar with evacuation routes, shelter locations, and safety protocols.

Whether caused by humans or nature, disaster preparedness involves governments, organizations, communities, and people taking preemptive efforts to manage the immediate aftermath of disasters. Main goal is to decrease disaster-related deaths and livelihoods (Karanci et al., 2005). For a community to be truly prepared, it's vital for its members to understand the risks they face. This awareness allows them to recognize potential disasters in their area, assess their severity, and determine their potential impact on themselves, their environment, and those around them (Suryaratri et al., 2020). Active participation from various stakeholders is crucial for effective disaster preparedness, making it essential for both households and communities to be involved (Widayatun & Fatoni, 2016).

2.2 Disaster Management and Community Awareness

Disaster risk reduction, human development and capacities, community-based disaster risk management, and disaster resilience affect disaster management. Strategic planning, preparedness, and mitigation, such as early warning systems and resilient infrastructure, reduce catastrophe risk. Community-based disaster risk management emphasizes involving local communities in disaster management to create customized strategies and use local expertise. Disaster resilience is a society's or system's ability to handle and recover from catastrophes and emergencies, restoring social, psychological, and physical balance.

2.2.1 Disaster Risk Reduction

Disaster Risk Reduction (DRR) focuses on preventing or minimizing disaster impacts through planning, preparedness, and mitigation efforts and involves strategies like early warning systems and resilient infrastructure to reduce exposure to hazards.

Disaster Risk Reduction (DRR) involves several key components that work together to minimize risks and enhance community resilience. First and foremost, disaster risk assessments play a crucial role in identifying and analyzing the various hazards we face and understanding their potential impacts on society and the environment. This knowledge is essential for making informed decisions. Another critical aspect is early warning systems, which are designed to alert communities about impending disasters, allowing timely preparation to reduce the potential fallout. According to Chisty (2020), these systems can significantly lessen the devastation caused by natural catastrophes.

Community awareness and education form the third essential component of DRR. By equipping individuals with knowledge about potential risks and training them on how to respond to disasters, we can foster resilience and ensure that DRR strategies are effectively implemented. Finally, it's important to integrate DRR into development planning. This approach can lead to the creation of sustainable and resilient communities that are not only better prepared for disasters but can also bounce back more effectively after they occur. The identification and minimization of disasters and their impacts on human life must be prioritized to pave the way for effective disaster management solutions (Setyawan et al., 2021).

Disaster risk reduction (DRR) is key in rural areas to enhance the community's resilience against various disaster-related challenges. The Community-Managed Disaster Risk Reduction training program is designed to empower local residents, as highlighted by Kanyasan and Nonaka (2018). With a duration of one month, this training brings together villagers directly affected by disasters, making it essential to underscore the importance of this initiative. Initially, the community faced significant hazards from landslides in the mountainous regions, threatening both homes and farmland. This situation prompted the first gathering of those impacted by these disasters. Another major concern is rising water levels, leading to potential flooding in low-lying areas, affecting agricultural land and settlements. Effective mapping is vital to predict and manage these flood risks (Haque and Fatema, 2022). Furthermore, the lack of a village spatial planning policy or a long-term development strategy for natural resource management has resulted in frequent changes in land use. This has led to a decrease in agricultural land and a heightened risk of flooding. Additionally, the ongoing strain on local ecosystems, coupled with a decline in environmental sustainability, has exacerbated the poverty faced by the population, creating a precarious situation for the community.

DRM awareness is low among local inhabitants and elected leaders. Disaster management and response decision-making and strategic policy debates involve few women. The village's unorganized religious and social groups might be powerful voices in the disaster risk reduction (DRR) movement (Lawangen & Roberts, 2023). The village values collaboration, tolerance, and self-reliance, which are essential to catastrophe recovery. Several critical steps are needed to improve disaster risk management in catastrophe-affected areas. First, the community must be informed on landslides, flood, and other local dangers, vulnerabilities, capacities, and risks. The second phase is educating local leaders to engage the community in disaster risk mitigation measures. Next, landslide and flood risk mapping must be participatory. Women must also be included in community disaster risk management. Finally, village communities must develop novel catastrophe risk management measures for resilience.

2.2.2 Human Development and Capabilities

It focuses on expanding people's capabilities to live the life they value. In disaster management, it involves empowering communities with the tools and resources needed for preparedness and recovery. Human development seeks poverty reduction, decent education, affordable housing, social equality, and food security. These goals help reduce catastrophe vulnerability in people, groups, and communities (Hallegatte et al., 2020). According to Cutter et al. (2003), social and physical elements enhance catastrophe susceptibility and harm to people and communities. When human development is limited, these vulnerabilities are compounded, resulting in more significant losses when disasters occur (Hallegatte et al., 2020).

Understanding this connection is vital for effective disaster risk management, which has often overlooked the broader socio-economic and environmental contexts (Henstra & Thistlewaite, 2017). This shift in perspective moves disaster risk governance from a reactive model, focused on managing the aftermath of specific events, to a proactive strategy aimed at disaster risk reduction. This strategy is integrated into a wider framework of social-ecological systems (Manyena et al., 2013). The field of disaster risk governance has seen growing interest in recent years (Raikes et al., 2019), but its understanding and application continue to develop.

Silos of social, economic, and political elements that affect catastrophe risk reduction and human development are a major issue (Munene et al., 2018). This divergence can produce conflicting governance models in public policies and

administrative structures, forcing decision-makers to balance catastrophe prevention and mitigation with other development goals. Many studies have demonstrated that the economic benefits of particular development may outweigh the economic losses from disasters, increasing community risk (Hallegatte et al., 2017).

2.2.3 Community-Based Disaster Risk Management

Community-Based Disaster Risk Management (CBDRM) emphasizes involving local communities in disaster management to create plans that address specific needs and leverage local knowledge. Communities are proactively identifying, assessing, treating, and planning for various hazards and vulnerabilities (Krummacher, 2014). The Community-Based Disaster Risk Management (CBDRM) process is aimed at enhancing skills, building capacities, and fostering resilience within these communities (Norris et al., 2007). Central to this process is the involvement of the community itself, ensuring that local issues, challenges, and problems are addressed from the perspective of those who face them daily. Empowering communities and promoting ownership of the process is crucial. Shaw and Goda, (2004) points out that CBDRM is intricately tied to specific cultural contexts, meaning that effective implementation cannot be achieved by outsiders alone. In CBDRM, local knowledge and established trust within the community play a vital role. According to Chhoun (2016), the foundation of CBDRM should rest on total disaster risk management principles, encompassing risk assessment, mitigation, preparedness, response, and rehabilitation, while also integrating and adapting indigenous coping strategies and knowledge for effective risk reduction.

Abarquez and Murshed (2004) emphasize the importance of the Community-Based Disaster Risk Management (CBDRM) process in enhancing public safety and building resilience within communities. They argue that CBDRM should play a vital role in promoting sustainable development that is both effective and equitable for all community members. Before starting the CBDRM process, it's essential to identify the various stakeholders involved. While numerous participants contribute to the CBDRM framework, they can primarily be grouped into two categories: insiders and outsiders (Kafle and Murshed, 2006). Insiders encompass local communities and the Disaster Risk Management Committee (DRMC) at the community level. In contrast, outsiders consist of government bodies, non-governmental organizations (NGOs), international NGOs (INGOs), private sector actors, and others. The dynamics between these groups

are critical for successfully implementing the CBDRM process and achieving its intended goals.

2.2.4 Disaster Resilience

The disaster resilience emphasizes strengthening community resilience through preparedness and adaptive capacity. Local knowledge is critical in this process, as it enables communities to better anticipate and respond to disasters by providing insights into historical patterns, environmental conditions, and effective coping mechanisms. Resilience generally refers to the ability of a system to endure, bounce back, or even emerge stronger in the face of significant challenges or shocks. Essentially, it reflects how well a community can self-organize, navigate away from negative circumstances, and rebuild itself even stronger than it was before (Kafle, 2012). Disaster resilience refers to the ability of a society, community, or system to withstand catastrophes. It's about how they manage to reduce damage and effectively utilize their social, physical, and mental resources (Varol and Kırıkkaya, 2017). In simpler terms, disaster resilience is about the capability to manage stress, crises, or disasters and eventually return to normal living conditions (Lucini, 2014).

Disaster resilience refers to how well a society or system can navigate and bounce back from disasters and emergencies, restoring balance in its social, psychological, and physical aspects (Ahsan et al., 2018). Another perspective defines it as the ability of communities to mitigate risks, prepare for crises, respond effectively, recover, and adapt to new conditions while learning from previous experiences (Mayunga, 2009). Essentially, disaster resilience encompasses the ability to reduce or prevent losses, manage disaster impacts, and recover with minimal disruption to social structures. Resilience can be viewed from two angles: as a result, or as a process. As a result, it reflects the ability to withstand dangers or recover from them. Alternatively, as a process, resilience embodies ongoing learning and taking responsibility to enhance and sustain the capability to deal with hazards (Cutter et al., 2008).

Two essential components of disaster resilience are absorptive capacity and coping capacity. Absorptive capacity refers to society's ability to mitigate the impacts of adverse events through pre-established coping strategies—essentially, how well a community can absorb shocks (Cutter et al., 2008). On the other hand, coping capacity encompasses a system's capability to foresee challenges, take proactive measures, achieve objectives, and effectively manage resources. It demands that societies utilize

their absorptive capacity during crises. In simpler terms, coping capacity is tied to the various factors influencing a society's readiness for disasters, their use of absorptive capacity, and their recovery efforts (Parsons et al., 2019). Overall, it highlights how prepared a society is to handle disasters, leveraging its absorptive capacity, and bounce back afterward.

The influencing factors of community awareness concerning disaster management involve education, past disaster experiences, communication, and the distribution of information, along with cultural and social factors. The level of education in a community directly impacts the extent of awareness related to disaster management strategies. Past experiences with disasters can significantly shape how individuals prepare for future events, much like the influence of education. The distribution of information acts as a proactive strategy aimed at informing specific groups about various social, economic, and educational issues pertinent to them.

2.2.5 Education

Community disaster management awareness depends on education. Education boosts knowledge, skills, self-confidence, awareness, problem-solving, and critical thinking (Asharose et al., 2015). Education's direct and indirect effects reduce risk and susceptibility. Natural disaster education illustrates this. Taking precautions before, during, and after a disaster can assist individuals and families survive, aid in rehabilitation, and expedite return to normal life (Mızrak, 2018).

Education matters in these measurements. People that get natural disaster education feel better psychologically and physically, share information, and disseminate education (Cutler and Lleras-Muney, 2006). Instead of fear-based techniques, empowering catastrophe training with proactive planning increases awareness and efficacy (Jones, 2013). This training informs people about potential dangers and gives them prevention options (Gerdan, 2019).

Education is regarding disasters needs to be approached from multiple disciplines, taking into account the diverse age ranges and educational backgrounds of learners. It should be woven into the educational framework through practical learning resources and collaborative activities, all guided by expert insights (Gerdan, 2019). In addition to common resources like brochures and pictorial guides, a wide array of tools can be utilized, including posters, booklets, television, radio, internet, and social media platforms, as well as workshops, symposiums, and panels (Rohrmann, 1999). For

example, informative videos tailored for different age demographics can be aired on national television to enhance public awareness and understanding of disasters (Kara and Altunbay, 2020). By fostering disaster awareness, we can significantly improve preparedness and promote appropriate responses before, during, and after natural calamities, ultimately helping to lessen the toll on lives and property.

2.2.6 Previous Disaster Experience

Rural communities are increasingly learning from past disasters and are moving towards more proactive strategies. They have established networks that include various stakeholders, such as government bodies, non-governmental organizations, and informal institutions (Paul et al., 2022). The lessons gained from various disasters over the years, coupled with these collaborative efforts, have enabled communities to build resilience and reduce the impact of future crises. Nonetheless, disasters continue to wreak havoc on infrastructure (Bostick et al., 2017). Communities that have faced floods in the past tend to have a heightened awareness of the associated risks and the plans in place to manage them. Having gone through such experiences fosters valuable lessons that shape their readiness and understanding of potential dangers.

While previous experiences have helped enhance coping mechanisms, challenges such as deteriorating infrastructure, inadequate maintenance of coastal roads and embankments, salinity intrusion, drinking water scarcity, poverty, and health issues remain serious concerns for coastal residents (Hoque et al., 2019). By deepening understanding of the lessons learned, along with the challenges and opportunities at hand can enhance the resilience of coastal communities through robust institutional support and stakeholder collaboration. It is vital to move away from solely remedial approaches and instead foster greater cooperation between various formal and informal stakeholders and networks.

Previous experience with disasters can significantly shape how individuals prepare for future events, much like educational influences. For instance, being directly impacted by a disaster tends to heighten awareness about the potential for damage and emphasizes the importance of being ready and knowing how to evacuate. This experience also contributes to a better understanding of recovery strategies and reinforces the ability to handle subsequent threats effectively (Sattler et al., 2000). As a result, this heightened awareness often translates into more proactive preparedness behaviors.

2.2.7 Communication and Information Dissemination

The accessibility and effectiveness of communication channels significantly affect community awareness. A disaster is an unexpected and devastating event that can significantly disrupt a community or society. It leads to substantial human, material, economic, and environmental losses, often overwhelming the community's ability to cope with these challenges on its own (IFRC, 2014). To effectively manage the threat of disasters, it's crucial to provide information that helps individuals prepare before, during, and after such events occur. Raising public awareness about disasters through information dissemination is vital for reducing risk. Information dissemination acts as a proactive service aimed at educating specific groups on various social, economic, and educational issues that matter to them. This process requires careful planning, organization, and storage of relevant information which is then communicated to the target audience through various channels (Dhawan, 2000).

The success of this information sharing largely depends on several factors related to both the providers and the audience. On the provider side, internal factors like effectiveness measurements, behavior and attitude changes, knowledge acquisition, costs, and evaluation play a key role. Meanwhile, external factors comprise cultural limitations, socioeconomic conditions, alternative sources of information, reinforcement of existing knowledge, and evidence-based insights. For the recipients, internal factors include the relevance they perceive in the information, their interaction with it, and their engagement in the dissemination strategies. External factors here involve recognizing the need for new knowledge, individual information-seeking habits, awareness of available information sources, and their openness to change prompted by new information (Duggan and Banwell, 2004).

Effective communication is essential for sharing disaster information. A key element in this process is the credibility of the source delivering the information. Hovland and Weis (1951) highlighted that credible source, characterized by their expertise and trustworthiness, are more likely to influence attitudes than those with lower credibility. During floods, local volunteer communities play a vital role in supporting their neighborhoods. These volunteers, often residents who have undergone training, are crucial for enhancing the dissemination of disaster information. These volunteer groups work closely with community leaders and opinion shapers, including government officials, health center staff, teachers, and cultural elders, to ensure that communication with the public is effective. The organization overseeing the volunteers

provides coaching to help them share disaster information accurately and efficiently. There are two main strategies for persuading message recipients. The first involves persuasion through the logical content of the message itself, while the second relies on non-message factors, such as the source's attractiveness, credibility, and emotional appeal (Weiten et al., 2012).

2.2.8 Cultural and Social Factors

Cultural influences influence risk perception, preparedness, and recovery (Appleby-Arnold et al., 2018). Culture encompasses language, religion, values, practices, and common history. These components shape how communities understand the world, including disaster problems and uncertainty (Appleby-Arnold et al., 2018). The cultural meanings of catastrophes affect how they are seen beyond their physical hazards (Appleby-Arnold et al., 2018).

Cultural identity influences catastrophe communication (Bankoff et al., 2015). Warning systems and public awareness campaigns work better when they match communities' cultural values and communication approaches (Reksa, 2021). Disaster preparation messaging can be better received by employing local languages, culturally meaningful symbols, and recognized community leaders (Reksa, 2021). Cultural insensitivity can lead to mistrust, uncertainty, and non-compliance, increasing vulnerability (Reksa, 2021). Additionally, cultural attitudes and behaviors are essential to catastrophe resilience. Traditional knowledge helps many communities plan and respond (Womack, 2021). Traditional practices can strengthen community resilience by providing early warning indicators and developing a shared feeling of vigilance.

Disaster risk and resilience depend on social status, including income, education, and employment (Jiang et al., 2020). Higher social standing usually means greater access to preparedness and recovery resources, knowledge, and networks. They can afford safer areas, house upgrades, and insurance, reducing risk and improving recovery (Tselios and Tompkins, 2019). Lower-class people suffer several difficulties. They may live in vulnerable locations, lack preparatory finances, and lack access to vital information and assistance (Jiang et al., 2020). This makes catastrophe recovery more difficult and increases their danger. Fair catastrophe risk reduction requires addressing economic inequality (Tselios and Tompkins, 2019). Thus, governments should prioritize cheap housing, information access, and community support structures to build resilience in lower-status populations.

2.3 Measurements for Community Awareness of Disaster Management

Assessing local knowledge in disaster management for flood-prone areas involves measuring the extent to which community-based insights are integrated into preparedness and response strategies. Key measurements include community participation, knowledge and resilience indicators.

2.3.1 Community Participation

Community participation plays a vital role in disaster-related activities, demonstrating how local knowledge can be harnessed effectively. Community participation is all about getting people engaged in projects aimed at addressing their own challenges or enhancing their socio-economic conditions. It involves active involvement in setting goals, as well as in the preparation, execution, and evaluation of plans and programs. According to the United Nations (1970), participation is a collective effort from different groups within society. At its core, it's a lively process where every group member contributes, shares, and impacts each other through the exchange of ideas and actions that lead to problem-solving and decision-making (Samad, 2002). The essence of community participation lies in giving a voice to the community and fostering their ability to tackle problems as they come, thus ensuring that the positive changes made are durable over time (Sastry, 2001). It encourages collaboration among individuals, fostering a sense of belonging while highlighting the value of their contributions.

Community participation in disaster management offers several benefits. For one, it empowers local residents to take an active role in shaping decisions regarding disaster planning and implementation. Additionally, these community-driven plans are more attuned to the specific vulnerabilities and needs of those affected (Barenstein, 2005). However, there are notable challenges associated with engaging communities in these efforts. Some of the primary issues include: (a) difficulties in getting community members involved in project design and management, (b) building mutual trust between local agencies and residents, (c) governmental reluctance to share power with low-income community groups, and (d) the tendency for community involvement to be reduced to mere labor contributions rather than meaningful engagement in decision-making processes (Davidson et al., 2007).

2.3.2 Knowledge

People living in flood-prone regions require disaster awareness to reduce flood risk (Adiwijaya, 2017). Floods harm humanity and the environment. Poor flood management, environmental factors, or individuals can make people vulnerable to floods. The community's flood resistance determines losses (Aji, 2015). Understanding flood catastrophe hazards is crucial to community preparation in flood disaster management. Comprehensive emergency planning and organization, available resources, clearly defined roles and responsibilities, effective agency coordination, essential service readiness, thorough training, and increased public awareness all contribute to effective preparedness (Aryo and Lubis, 2014).

The key element in disaster preparedness is the knowledge of rescue techniques that individuals, families, and the broader community possess (Sarwono, 2019). This understanding plays a crucial role in fostering a sense of urgency and readiness within communities, particularly in regions vulnerable to natural disasters. With increased awareness, communities can better prepare for potential disasters, ultimately reducing the risk of casualties, property damage, and disruptions to daily life (Lindawati and Wasludin, 2017). To address the threats posed by flash floods, which can lead to both tangible and intangible losses, engaging in awareness campaigns and conducting simulations for flash flood preparedness can be highly effective (Aini and Pristiwandono, 2017).

2.3.3 Resilience Indicators

Using local knowledge to reduce catastrophe risk, Omar Chong (2020) identified four stages of community resilience: prevention, prediction, preparedness, and coping. Residents improved construction procedures and used floodproofing materials to prevent flooding. They sometimes forecast flooding by observing animal behavior and environmental changes. Beyond physical strategies, community members also draw on spiritual beliefs, dreams, and rituals to inform their disaster preparedness. When it comes to coping strategies, communities prioritize safe storage for staples like rice and engage in trading livestock for cash during emergencies. Indicators of resilience reflect a community's capability to bounce back from floods, including the effectiveness of early warning systems rooted in local knowledge and the incorporation of this knowledge into formal disaster plans, along with feedback mechanisms for continuous improvement.

Disaster preparedness extends beyond swift response capabilities; it also encompasses readiness for rapid recovery post-disaster. There's a growing global recognition of this need, as building disaster-resilient communities plays a crucial role in preventing future losses (Gall, 2013). Resilient communities can better endure crises and often emerge stronger than before (Arbon et al., 2016). Community resilience is an ongoing participatory process that fosters preparedness ahead of disasters and supports a healthy recovery afterward (Arbon et al., 2016). Social disaster resilience embodies a community's ability to coexist with, cope with, and manage disasters through an integrated, comprehensive, and positive approach. It generally includes the capacity to perform well under pressure, adapt successfully to new challenges, and cultivate self-confidence and social capability (Arbon et al., 2016).

2.4 Review on Previous Studies

Yin Mar Nay Win (2019) examined community disaster risk management. The study's main goals are to assess disaster risk reduction and management and household disaster risk performance in Bilin Township. A survey conducted in seven villages of Bilin Township, located in Thaton District of Mon State. The findings indicate that there is a significant need to enhance disaster knowledge within the community. The community receives early warning information primarily from village leaders, with limited access to media channels and telecommunications due to inadequate infrastructure, such as electricity and communication systems in Bilin Township. Additionally, members of the disaster management committee at the township level must familiarize themselves with disaster management policies and guidelines to fulfill their responsibilities effectively. There is also a pressing need for better allocation of emergency funds and relief materials, especially during times of crisis. In conclusion, the current disaster risk reduction and management system at the township level is not adequately equipped to respond effectively to emergencies.

Kyaw Zin Latt (2020) examined Labutta Township's catastrophe resilience expertise. The project seeks to establish local knowledge of community resilience in Labutta Township and evaluate crucial elements affecting reaction and catastrophe preparedness for future disasters. Storms and floods are Labutta Township's biggest concerns, according to the poll. State and Township Committees must protect their communities and properties from these calamities. The findings show that local catastrophe resilience knowledge is lacking and that communities' support mechanisms

require strengthening. Disaster management at the state and community levels requires understanding local resilience.

Kamarudin et al. (2022) explore community responses to disasters based on local knowledge before, during, and after. Scholars stress that local knowledge may improve scientific understanding and construct a comprehensive local catastrophe risk reduction plan. This study found that all cases have adopted local knowledge strategies for flood preparedness and response, including agricultural techniques and livestock trading, stockpiling food and other essentials, documenting flood levels as historical records, floodproofing animal shelters, constructing overhead storage cabinets and outdoor huts, and saving boats for emergencies. It is clear that local knowledge helps mitigate catastrophe risks and build resilient communities.

Hargono et al. (2023) examine Indonesian community preparedness for disasters and community awareness. The study included accessible, voluntary community members who completed surveys. The study found that individuals with lower catastrophe awareness were roughly twice as likely to have lower disaster response preparation. Public knowledge of catastrophe preparedness is vital. Non-governmental groups and community leaders can work with the government to educate and teach the community to manage catastrophes.

Parvin et al. (2023) examined disasters, issues, and lessons in southwestern coastal Bangladesh. The study found that disaster-related concerns have historically included the drinking water shortage, bad roads, poverty, sanitation, and health difficulties. After reflecting on prior disasters, community members have improved their behaviors by stockpiling emergency food, building durable housing, and raising disaster awareness. However, poor infrastructure continues to plague coastal towns. Thus, these communities want better stakeholder support and networking.

Khine Myat Tun (2024) examined Bago Township residents' flood risk management understanding. The study examines Bago River basin inhabitants' flood risk knowledge and attitudes of flood risk management. The poll found that households receive enough flooding information, but updates are often inaccurate, especially during critical moments. Investing in modern communication systems that can provide real-time notifications to TVs and phones can help close this gap. Residents have considerable fear about future floods, a sense of personal accountability, and varying degrees of faith in local and governmental flood control. These findings emphasize the need for community education, resource availability, and disaster preparedness.

Raham, et al. (2024) assessed flood preparation in Bangladesh's flood-prone rural Dowarabazar Upazila, Sunamganj District. Field survey has 596 responses. The data shows that flooding has left many residents feeling insecure. Most respondents worried about flooding threatening their houses. Many participants reported receiving flood updates from local sources, but most did not receive flood predictions or warnings. Most people took safety in flood shelters, according to statistics. However, many individuals were ignorant of flood preparedness techniques, indicating loss mitigation and adaptation gaps. Flood readiness was affected by gender, age, employment, monthly income, multiple income sources, and house type. Researchers found that women are less prepared for floods than males, while pucca housing inhabitants are more prepared than those in more susceptible constructions. These disparities must be considered by authorities while enhancing flood preparation. A thorough flood preparedness strategy must be addressed alongside livelihood plans and educational activities.

CHAPTER III
DISASTER RISK AND PREPAREDNESS IN KAYIN STATE

3.1 Disaster Risk in Myanmar

Myanmar borders Bangladesh, India, China, Laos, and Thailand, with the Andaman Sea and Bay of Bengal to the south and southwest. The nation has 676,590 square kilometers of hilly and mountainous terrain (FAO, 2011). The northern highlands, western ranges, eastern plateau, middle basin with lowlands, and low-lying coastal plains make up this area (Aung-Thwin, et al., 2019). Myanmar is in the tropical zone, with high temperatures, humidity, and yearly rainfall that varies by monsoon, height, and location. According to the 2008 constitution, Myanmar has twenty-one subdivisions: seven states (mostly ethnic groupings), seven regions, one union territory, five self-administered zones, and one division. The Department of Population estimated 54,457,024 people in 2019.

Location, regional weather patterns, geological features, and terrain make Myanmar vulnerable to natural and human-caused disasters. Floods account for half of all disasters, followed by storms (23%), earthquakes (15%), and mass soil movement (12%) (JICA, 2015). Flash flooding threats must also be considered. Due to severe rainfall, impermeable surfaces, and poor soil absorption capacity, these disasters can quickly threaten huge populations and infrastructure. Droughts, wildfires, tsunamis, diseases, and technology catastrophes from industrial or transportation mishaps are other risks. Cyclones from the Bay of Bengal along the western shores also affect the nation. Cyclones last four to five days, depending on the season. Cyclones and storms of various strengths can occur in mid-April to mid-May and October to November during the pre- and post-monsoon months (Department of Meteorology and Hydrology, 2019).

Such events can cause storm surges and coastal flooding, increasing coastal flooding hazards. The Rakhine State, Ayeyaerwaddy area, and other coastal regions are at high danger of tropical storms with Saffir-Simpson storm strength ratings of five. Flood plains and waterways determine flooding danger. Ayeyarwaddy, Chindwin,

Sittaung, and Thalwin are among the 60 major rivers in the nation, which flow from North to South toward the Bay of Bengal due to its terrain (Aung, et al., 2017). Fertile places with good agricultural and fishing prospects draw huge populations. The Myanmar Unified platform for Disaster Risk Application (MUDRA), created by the Department of Disaster Management with technical assistance from ADB, estimates that over 1 million Myanmar residents are at risk from riverine flooding and storm surges, with one-third of them in the Ayeyarwaddy Region.

Myanmar has low-intensity surface fires, which are generally caused by high temperatures, dry conditions, and minimal rainfall (Department of Meteorology and Hydrology, 2009). However, they threaten forests, watersheds, animals, the economy, and local inhabitants. Landslides, often caused by severe rainfall or seismic activity, are another problem for a hilly nation. Unplanned agricultural growth, settlement development, slope cutting, erosion, and hydrological cycle changes worsen the issue. Myanmar is vulnerable to earthquakes caused by the Himalayan orogeny or the subduction of the Indian Plate beneath the Burma Platelet (a segment of the Eurasian Plate) (Department of Meteorology and Hydrology, 2009). Five seismic risk zones, rated I to V, have been identified, with the most dangerous in the north and center.

Table (3.1) Natural Disaster in Myanmar (2015-2024)

Period	Flood	Strong Wind	Earthquake
2015-2016	104	191	0
2016-2017	243	496	6
2017-2018	223	852	0
2018-2019	254	1676	2
2019-2020	331	1187	5
2020-2021	152	898	2
2021-2022	13	131	0
2022-2023	70	779	4
2023-2024	144	661	2

Source: Central Statistical Organization, Myanmar

According to data from Central Statistical Organization (Table, 3.1), the strong winds are more frequent than other natural hazards in Myanmar. Strong winds highly occur about four times more frequently than floods and about 330 times more frequently

than earthquakes. Therefore, the most common natural disaster in Myanmar is strong winds.

Table (3.2) Natural Disaster in States and Regions of Myanmar (2023-2024)

States/Regions	Flood	Strong Wind	Earthquake
Kachin	1	11	1
Kayah	0	2	0
Kayin	7	6	0
Chin	0	6	0
Sagaing	6	16	0
Taninthayi	2	21	0
Bago	16	75	0
Magway	54	106	0
Mandalay	14	83	0
Mon	10	22	0
Rakhine	4	16	0
Yangon	5	26	0
Shan	15	96	0
Ayeyarwady	8	137	1
Nay Pyi Taw	2	38	0

Source: Central Statistical Organization, Myanmar

According to data from Central Statistical Organization (Table, 3.2), the strong winds are highly disaster in any States and Regions of Myanmar. Magway and Ayeyarwady Regions experienced the highest number of floods and strong winds. Bago, Mandalay, and Shan also reported a significant number of strong wind events.

3.2 Flood Disaster in Kayin State

Countries prone to hydrometeorological risks are at risk from climate change. It is projected to intensify flooding, storms, and storm surges and prolong droughts. The loss of biodiversity and ecological systems could harm millions of people, especially those who depend on fishing and subsistence agriculture, which require environmental stability. Increased temperatures may reduce rice, wheat, maize, soybean, and peanut production (World Bank, 2019). Flooding, storms, increasing sea

levels, coastal erosion, and soil salinization threaten deltaic and low-lying agricultural regions, which are highly productive and economically essential (World Bank, 2019).

Kayin State's main calamity is flooding, since it is crossed by numerous significant rivers, including Thanlwin, Jaing, Attayan, Thaungyinn, Hawngthayaw, Zami, Hlaing Bwe, and creeks. Kayin State flooding is caused by heavy rain and strong seas. Thus, rainfall-induced floods and landslides are widespread throughout the region. The Myanmar hazard profile classifies Kayin State as seismic category II for earthquakes, suggesting a moderate risk, and it has regular thunderstorms. Flooding in Kayin State has been increasing, causing damage to paddy fields, the main source of livelihood, riverbank erosion, the destruction of homes, livestock, roads, bridges, and other infrastructure, and health issues from contaminated water. Due to climate change and environmental deterioration, Kayin State is more likely to experience rainfall-induced floods in the future.

Table (3.3) Flood Disaster in Kayin State (2015-2024)

Period	Case	No. of Death Person	No. of Injury Person	No. of Affected Person	Disaster Affected People
2015-2016	4	0	0	2217	7747
2016-2017	2	0	0	348	1626
2017-2018	3	0	0	455	2265
2018-2019	5	0	0	7290	36997
2019-2020	6	0	0	1038	5077
2020-2021	13	2	0	2318	10392
2021-2022	0	0	0	0	0
2022-2023	3	1	0	622	2379
2023-2024	7	0	0	20	71

Source: Central Statistical Organization, Myanmar

According to Table (3.3), the most frequent floods in Kayin State occurred in (2020-2021), and the mostly affected person damaging floods occurred in (2018-2019) and (2020-2021) in Kayin State.

3.3 Flood Disaster in Hlaing Bwe Township, Kayin State

Kayin State has seven townships, including Hlaing Bwe in Hpa-An. This township has three administrative divisions: Hlaing Bwe Township (Main), Paingkyon Sub Township, and Shan Ywa Thit Sub Township. These three territories have 13 wards, 72 village tracts, and 371 villages. While past floods in Hlaing Bwe Township have not directly threatened life, they have forced communities to evacuate, damaged property and livelihood assets, damaged critical infrastructure like roads and bridges, caused economic losses, and caused diarrhea and cholera. Flooding occurs in Hlaing Bwe Township because most of the rainfall occurs from mid-May to September. Riverine flooding is widespread in Hlaing Bwe Township, affecting villages and property along the Thanlwin River, Hlaing Bwe Creek, Maepa Creek, and Dha Jaing Creek. The higher portions of these river systems in the Dawna mountainous highlands are sparsely populated and have little land usage, yet flash floods occur often.

Heavy rainfall and strong tides from the Gulf of Martaban, coming through the Thanlwin and Jaing rivers, produce flooding in Hlaing Bwe Township. The primary river systems of Hlaing Bwe Township have constricted and shallowed due to water basin siltation, increasing flood danger. Cloudbursts upstream, low infiltration rates, and inadequate infrastructure including clogged drainage systems cause urban flooding in Hlaing Bwe Township. Three administrative areas make up Hlaing Bwe Township: Paingkyon Sub Township, Shan Ywar Thit Sub Township, and itself. Only Hlaing Bwe Township (Main) and Paingkyon Sub Township, located in low-lying plains near rivers and streams, experience riverine floods.

The flooding zones in Hlaing Bwe Township can be divided into three areas: (i) the Than Lwin River, which flows through the western and northwestern corners of the town; (ii) the upper section of the town and its low-lying villages; and (iii) the lower part of the town and its low-lying villages. These locations include settlements in southwestern Paing Kyon Sub Township and southern Hlaing Bwe Township. Hlaing Bwe Township has four wards, 36 village tracts, and 151 villages. Flooding occurs in all four wards and 43 communities in 19 village tracts. Paingkyon Sub Township has five wards and 27 village tracts, totaling 153 communities. Three villages from two tracts often flood.

Table (3.3) shows that Hlaing Bwe Township's four most populous wards and villages account for 30% of the flooded regions. Thus, flood catastrophe planning

should prioritize 30% of these inundated locations. Because of their higher population density, the township's most populated wards and villages are also more fire-prone.

Table (3.4) Most Popular Flooding Wards and Villages in Hlaing Bwe Township

No.	Wards and Villages
1	Ward A
2	Ward B
3	Ward C
4	Ward D
5	Ka Mawt Ka Chuu Village
6	Kaw Pawt Village
7	Shwe Gun Village
8	Ko Maung Village
9	Kyone Pa Ko Village
10	Kyoet Chaung Village
11	Wagoke Taw Village
12	Kat Pa Lin Village
13	Naung Boe Gyi Village
14	Kawt Nwet Village
15	Daw Lan Village

Source: Hlaing Bwe Township Disaster Preparedness Committee

Typically, the duration of flood inundation ranges from three to five days; however, in certain areas, it may take up to one month for the floodwaters to recede. Flooding is good and bad. Overflowing rivers bring new fish and assist spawning, which benefits fishermen. Flooding also cleans agricultural land and replenishes nutrients, creating alluvial soils suitable for winter crops like ground nuts and mustard. Flood damage in Hlaing Bwe Township is seen in Table (3.4).

Table (3.5) Impacts of Flood Disaster in Hlaing Bwe Township (2015-2024)

Period	Location	Impacts
2015-2016	Kaw Mawt Ka Chu Village	1 person drowned; 3 houses damaged; 68 households totaling population 402 temporarily displaced; farmland partially inundated; estimated loss of 1.2 million Kyat
	Shwe Gun Village	45 households affected and evacuated; minor damage to agricultural land; no casualties reported.
	Hti Lon Village	30 households affected; flooding caused damage to 2 community structures; temporary road
2016-2017	Low lying plains of Wards A, B, C and D and Paing Kyone Village	4 houses damaged; 95 households totaling population 550 affected and evacuated; minor agricultural losses; estimated economic loss of 1.43 million Kyat.
2017-2018	Kawt Lon Island and Wards A, B, C, D	2 people dead; 30 houses damaged; approximately 200 households affected and evacuated; extensive flooding submerged farmlands; significant livestock losses; road and infrastructure damage; estimated economic loss of 15 million Kyat. Floodwaters inundated residential areas; several households displaced; agricultural fields submerged causing crop loss; community urgently required relief support.
2018-2019	Low lying plains of Wards A, B, C and D	5 houses damaged across the wards; 36 schools temporarily closed disrupting education for over 3,000 students; approximately 120 households affected and evacuated; floodwaters damaged key road sections, causing transportation delays; agricultural fields waterlogged leading to estimated crop losses; no casualties reported; estimated economic loss of 7.8 million Kyat.

Table (3.5) Impacts of Flood Disaster in Hlaing Bwe Township (2015-2024)

(Continued)

Period	Location	Impacts
2019-2020	Low lying plains of Wards A, B, C and D	7 houses damaged by floodwaters; no casualties reported; around 180 households affected and evacuated; 250 acres of farmland submerged causing crop losses; damage to local roads and community facilities; increased health risks due to stagnant water; total economic loss estimated at 9.25 million Kyat.
2020-2021	Kyone Kanya Village Kawt Nwe Village Kawt Lon Island (edge areas)	2 houses partially damaged; 35 households affected; paddy fields flooded, damaging early-stage crops. 1 house severely damaged; 20 households temporarily displaced; livestock losses reported. 2 houses affected by rising water levels; erosion along small paths; local access routes cut off.
2021-2022	Hti Ka Lay Village Taung Kyar Inn Village	3 houses damaged by floodwaters; around 30 households temporarily relocated; small bridges and pathways affected. 2 houses affected; farmlands inundated; minor road erosion reported.
2022-2023	Sanpya Ward and Ywarthit Ward in Shwegon Village	9 houses destroyed or damaged due to the Thanlwin River overflow; no casualties reported; 57 people across 8 households received relief cash and rescue packs (rice and essential items), totaling 1.11 million Kyat.
2023-2024	Sanpya Ward and Ywarthit Ward-1 in Shwegon Village	The water level of the Thanlwin River in Hlaing Bwe Township has reached 1280 centimeters on September 14 and exceeded 1050 centimeters of its danger level. Due to the rising water level of the Thanlwin River, 8 houses in Sanpya Ward and Ywarthit Ward-1 in Shwegon Village in Hlaingbwe Township located near Thanlwin River Bank were destroyed, and local people were temporarily evacuated to safer places.

Source: Hlaing Bwe Township Disaster Preparedness Committee

3.4 Disaster Risk Reduction in Hlaing Bwe Township

The institutional framework for disaster management serves as a legal basis for reducing disaster risks. It is a legally mandated entity concerning disaster management, with primary responsibilities that include establishing policies, issuing guidelines, and developing and executing plans, among other tasks. The country has an institutional structure for disaster management that operates at all administrative levels, from national to local.

3.4.1 Hlaing Bwe Township Disaster Preparedness Committee

Central disaster management is handled by Hlaing Bwe Township Disaster Preparedness Committee (TDPC). Four subcommittees have been formed to implement TDPC disaster management initiatives in local situations. News, Information, and Education, Emergency Evacuation, Search, and Rescue, Health, and Relief, Rehabilitation, and Reconstruction are these subcommittees. The Township Administrator, Township Fire Department Officer, and Deputy Township Administrator are the Chair, Secretary, and Joint Secretary of the Hlaing Bwe Township Disaster Preparedness Committee (TDPC). The TDPC also includes various Hlaing Bwe Township Civil Society Organizations and Humanitarian Agencies.

Township Administrator, the TDPC chair, is vital to improving the Hlaing Bwe Township Institutional Arrangement for Disaster Management. Their word and spirit dedication to township catastrophe management will greatly impact this approach. Their duties include coordinating disaster management with national and international organizations and promoting contact between Non-Governmental Organizations and the TDPC. The Chairperson leads all TDPC meetings unless they are unavailable.

The TDPC Secretary and Joint Secretary (hereinafter referred to as Secretaries) assist the chair in managing township disaster response by collaborating and coordinating with government departments, civil society organizations, and humanitarian agencies on disaster risk reduction. The Township Fire Department Head ensures the TDPC's operational preparedness and advises the Chairperson and TDPC on disaster concerns, both during regular and disaster activations. To assist the Township Administrator, the TDPC was created. This committee must meet every six months under the Township Administrator. TDPC duties fall into three disaster management phases: Disaster Prep, During, and After.

(i) Before Disaster

The roles and responsibilities of the TDPC are categorized under the before disaster phase of disaster management are providing policy decisions as necessary, reviewing and updating the TDMP on an annual basis, ensuring effective coordination among all township departments, supervising and coordinating pre-disaster activities of various subcommittees, ensuring the development of disaster prevention plans in wards and villages, as well as monitoring their implementation, ensuring the integration of Disaster Risk Reduction (DRR) into departmental development initiatives at the township level, initiating DRR capacity-building programs in close partnership with the Relief and Resettlement Department, the Kayin State Government, and the DRR Working Group, formulating and executing procedures to mitigate and prevent the effects of flooding, storms, and other natural disasters, while preparing for rescue operations, supply distribution, and rehabilitation in accordance with the policies and guidelines established by the relevant authorities, compiling a list of Dos and Don'ts for various hazards that are prevalent in Hlaing Bwe Township and developing programs to educate the community and encourage their involvement in preparing for the prevention of the impacts of flooding, storms, and natural disasters, conducting mock drills involving TDPC and its Sub Committees to assess the effectiveness and practicality of the respective plans, developing policy guidelines for coordination on matters deemed to necessitate external assistance and identifying activities aimed at mitigating disaster risks, such as constructing dams and elevating road levels.

(ii) During Disaster

Under the during disaster phase of disaster management, the TDPC assigns and designates responsibilities to departments and agencies based on the severity of the natural disaster, oversees and coordinates the activities of various subcommittees, provides oversight during natural disasters and rescue and resettlement operations, and supervises the implementation of act.

(iii) After Disaster

In the disaster phase of disaster management, the TDPC gathers real-time information from wards and village tracts about the natural disaster, losses, damages, and protective measures and reports it to higher authorities. Preparing detailed reports for higher-level agencies and departments on search and resettlement assistance and

overseeing the systematic distribution of the assistance received, ensuring prompt distribution of financial and material aid from State and local donors to victims, and supervising and coordinating post-disaster activities of various subcommittees, particularly in collaboration with the Rehabilitation and Reconstruction Su Working with foreign non-governmental organizations administering national management committee support, analyzing subcommittee disaster-related activity reports, and providing direction.

3.4.2 Disaster Management Plan of Hlaing Bwe Township

Natural catastrophes destroy lives, property, livelihoods, and development. Development funds are diverted to relief, rehabilitation, and recovery following such calamities. Disasters have long-term social and economic effects on communities, especially the poor, who are more vulnerable to them. Disaster risk reduction is essential to development and poverty reduction. The Myanmar government recognizes the importance of disaster management in nation-building and has ordered the creation of disaster management frameworks at all administrative levels, including townships. Myanmar's administrative system relies on the township to link communities to sub-national entities. Parliamentarians are chosen by township seats, and most government agencies are represented there. After considering the above, townships are vital for disaster risk reduction and response.

The Myanmar government has created a Township Disaster Management Plan Guideline. The Hlaing Bwe Township Disaster Preparedness Committee drafted the Disaster Management Plan in April 2011 and revised it in May 2012 under the direction of the Kayin State and Hpa-An District Committees. Hlaing Bwe Township has other disaster management plans, including the June 2012 Flood Disaster Management Plan created by the Township Disaster Preparedness Committee (TDPC). Hlaing Bwe Township Fire Disaster Preparedness Plan, developed by the Township Fire Department in December 2012, Shwegone Village Tract Disaster Management Plan, drafted by the Committee in July 2012, and Search and Rescue and Disaster Management Plan, prepared by the Army Deployment, South East Command in January 2012.

These texts complement one other, yet vertical and horizontal integration is needed.

The Hlaing Bwe Township Disaster Management Plan focuses on repeated floods to protect lives, property, livelihoods, and development. The following strategic goals will drive TDMP evaluation and revision to achieve this goal. They must establish baseline data for Hlaing Bwe Township to plan disaster management, perform hazard, vulnerability, and capacity assessments to assess disaster risks, and establish an institutional framework to improve stakeholder coordination.

Before, during, and after disasters, the disaster management committee performs its duties.

(i) Before Disaster Time (Mitigation and Preparedness)

These duties include catastrophe prevention and risk reduction. Mitigation and preparation steps can be conducted before a disaster. The interval before a disaster encompasses non-disaster eras and the immediate precursors. Both categories involve long-term initiatives to reduce disaster damage and loss. Minimizing catastrophe impact is the goal of mitigation. Infrastructure projects including bridges, protecting dikes, and embankments, safe architectural design and construction, and retrofitting existing structures are typical mitigation efforts. Flood Preparedness involves a wide range of efforts prepared ahead of probable floods to reduce damage to the community, economy, and other resources.

Preparedness activities are aimed at helping people and communities handle disaster consequences that cannot be mitigated. These non-structural preparedness efforts improve catastrophe prediction, response, and recovery. Training government officials, strategic planning, increasing awareness, land use planning and zoning, legislative measures, strengthening institutions and organizations, and disaster and development advocacy are among preparedness efforts.

(ii) During Disaster Time (Emergency Response)

Emergency response reduces the consequences of calamities like floods. The main components are emergency operations and logistical management. Key emergency response participants must understand their roles and duties to perform critical activities during a flood response. Evacuating communities, providing assistance (food, water, and medication), mobilizing search and rescue operations, and assessing damage are critical emergency response responsibilities. Emergency response

activities must follow the Hlaing Bwe Township Disaster Management Plan's Standard Operating Procedures.

(iii) After Disaster Time (Recovery and Rehabilitation)

These operations also include disaster recovery and rehabilitation. These projects restore communities and resources to their pre-disaster state, helping people resume their pre-flood social and economic activities. Recovery and rehabilitation efforts include restoration, reconstruction, and long-term community rehabilitation. These may include (1) post-disaster damage assessments to determine specific recovery requirements; (2) environmental cleaning to prevent disease outbreaks or debris-related injuries; and (3) re.

CHAPTER IV
SURVEY ANALYSIS

4.1 Survey Profile

Hlaing Bwe Township is located in Kayin State and Southeastern of Myanmar. It is bordered by the Hpapun Township to the North, the Myawaddy Township and Kawkareik Township to the South, the Hpa-An Township to the North and shares an international border with Thailand to the East. This township is situated between North Latitude 16 degree 14 minutes to 17 degree 15 minutes and East Longitude 96 degree 14 minutes to 98 degree 28 minutes. The township area is East to West 45 miles and South to North 65 miles with 1671.74 miles. The landscape of Hlaing Bwe Township has many hills and valleys in the East, and only a few flat plains in the rest of the area. In the middle of the township, there are many hills and small mountains running north and south, and there are few flat plains, with many valleys and valleys.

Hlaing Bwe Township has a hot, humid climate with highs of 42°C and lows of 23°C. It is 20 feet above sea level. Kayin, Burmese, and other minority groups live in this area. Many rural inhabitants work in agriculture, forestry, and small business. According to the General Administration Department of Hlaing Bwe Township (2024), the population is 321782, with 302027 (94%) in rural regions and 19755 (6%) in urban areas. Table (4.1) lists 371 villages, 72 village tracts, and 13 wards in the township.

Table (4.1) Information of Hlaing Bwe Township

Description	Urban (No.)	Rural (No.)
No. of House	3063	45739
No. of Household	3305	48027
No. of Wards	13	-
No. of Village Tracts	-	72
No. of Villages	-	371
Total Population	19755	302027

Source: Hlaing Bwe Township General Administration Department (2024)

The economy of Hlaing Bwe Township is primarily agrarian, with rice, corn, and various cash crops being the main agricultural products. The fertile land and favorable climate conditions support farming activities, although the economy is often impacted by seasonal flooding. In addition to agriculture, local markets play a vital role in the economy, providing a platform for trade and commerce among residents. Hlaing Bwe Township has a developing infrastructure, with roads connecting it to nearby towns and cities. However, the quality of these roads can vary, particularly during the monsoon season when flooding can disrupt transportation. Access to basic services such as healthcare, education, and clean water is improving but remains a challenge in some rural areas.

4.2 Survey Design

The survey for this study was conducted the assessment of community awareness on disaster management in annual flood-prone areas of Hlaing Bwe Township. A sample of 200 rural people from four wards and four villages chosen a random sampling method. In-person interviews were used to collect primary data. The selection of wards and villages was made to ensure diversity in terms of the effect of flooding. (Table 4.2)

Table (4.2) Sample of Respondents

Wards and Villages	Number of Respondents
Ward (A)	25
Ward (B)	25
Ward (C)	25
Ward (D)	25
Shwe Gun Village	25
Hti Lone Village	25
Paing Kyone Village	25
Ka Mawt Ka Chu	25
Total	**200**

Source: Survey Data (2025)

The survey questionnaire consists five parts such as characteristics of respondents, flood information, flood experience, flood awareness, and flood disaster

management in the community. Respondents assessed these impacts using a 5-point Likert scale to capture their experiences, and open-ended questions provided the opportunity for richer insights. Face-to-face interviews were conducted between April and May 2025 to ensure thorough and accurate data collection.

4.3 Survey Result

The survey data analysis shown in this section. Part (A) indicates the characteristics of respondents. Part (B) presents flood information of respondent. Part (C) shows flood experience of respondents. Part (D) illustrates flood awareness of respondents. Part (E) is the respondent opinion on flood disaster management in the community.

(A) Characteristics of Respondents

Table (4.3) shows the characteristics of 200 respondents. It includes gender, completed age, marital status, education level, religion, nationality, occupation, native, duration of stay in Hlaing Bwe Township, and number of family members.

Table (4.3) Characteristics of Respondents

No.	Description	Category	No. of Respondents	%
1	Gender	Male	103	51.5
		Female	97	48.5
		Total	**200**	**100**
2	Completed Age (Years)	21 - 30	73	36.5
		31 - 40	60	30.0
		41 - 50	45	22.5
		51 - 60	13	6.5
		61 and above	9	4.5
		Total	**200**	**100**
3	Marital Status	Single	65	32.5
		Married	135	67.5
		Total	**200**	**100**
4	Education Level	Undergraduate	128	64.0
		Graduate	70	35.0
		Postgraduate	4	2.0
		Total	**200**	**100**

Table (4.3) Characteristics of Respondents (Continued)

No.	Description	Category	No. of Respondents	%
5	Religion	Buddhist	134	67.0
		Hindu	30	15.0
		Christian	18	9.0
		Islam	18	9.0
		Total	**200**	**100**
6	Nationality	Burma	16	8.0
		Kachin	6	3.0
		Kayin	116	58.0
		Mon	36	18.0
		Rakhine	15	7.5
		Shan	11	5.5
		Total	**200**	**100**
7	Occupation	Government Employee	26	13.0
		Private Employee	38	19.0
		Agriculture	75	37.5
		Fishing	21	10.5
		Trading	40	20.0
		Total	**200**	**100**
8	Native	Hlaing Bwe Township	168	84.0
		Other Township	32	16
		Total	**200**	**100**
9	Duration of Stay in Hlaing Bwe Township	Less than 5 years	41	20.5
		5 years to 15 years	37	18.5
		More than 15 years	122	61.0
		Total	**200**	**100**
10	No. of Family Members	Less than 5	73	36.5
		More than 5	127	63.5
		Total	**200**	**100**

Source: Survey Data (2025)

Regarding from Table (4.3), the survey result showed that a majority of the respondents were male (103 respondents or 51.5%) while (97 respondents or 48.5%). In studying the age distribution, the largest group fell within 21 years to 30 years (73 respondents or 36.5%) followed by aged between 31 years to 40 years (60 respondents or 30%), between 41 years to 50 years (45 respondents or 22.5%), between 51 years to 60 years (13 respondents or 6.5%) and aged 61 and above (9 respondents or 4.5%). The majority of respondents identified as Buddhist and were married. In examining the respondents' educational qualifications, (128 respondents or 64%) have no degree, (70 respondents or 35%) have a degree, and (4 respondents or 2%) have a postgraduate degree. Most of the respondents are Kayin and Hlaing Bwe Township is their native place. The main economic activity in the area is agriculture comprised the largest occupational group (75 respondents or 37.5%). Other occupations included government employees (26 respondents or 13%), private employee (38 respondents or 19%), fishing (21 respondents or 10.5%), and trading (40 respondents or 20%). The majority of respondents is staying in Hla Bwe Township more than 15 years (122 respondents or 61%), followed by less than 5 years (41 respondents or 20.5%) and 5 years to 15 years (37 respondents or 18.5%). Most of the respondents have less than five members.

(B) Flood Information

The ten flood information questions asked 200 respondents where they obtained information about floods and whether they were aware of flood prevention guidelines issued by the Disaster Management Committee, as shown in Table (4.4).

Table (4.4) Flood Information

No.	Description	Mean
1	Information is available before, during, and after a flood.	3.44
2	Obtain accurate information regarding evacuation methods during a flood event.	3.39
3	Early warning system is received from relevant organizations hours before a flood occurs.	4.00
4	Ability to identify fake and real information about floods.	3.36
5	Read weather reports and easily understand flood risks.	3.84
6	Understand the flood information released by relevant organizations.	2.99
7	Information on flood relief released by relevant organizations is available within a short time.	3.25
8	The disaster management committee flood warning statements are accurate.	4.47
9	The disaster management committee is confident in the effective flood prevention and relief information.	3.67
10	Implement flood prevention guidelines issued by the disaster management committee.	3.94
Overall Mean Value		**3.64**

Source: Survey Data (2025)

According to Table (4.4), the mean value of 4.47 signifies that the respondents have strongly agreed that the flood warning statements issued by the disaster management committee are precise. The mean value of 4.00 indicates that the respondents agree that the early warning system is communicated by relevant organizations several hours prior to the occurrence of a flood. The mean value of 3.94 demonstrates that the respondents agree with the implementation of flood prevention guidelines provided by the disaster management committee. The mean value of 3.84 reflects that the respondents agree they read weather reports and comprehend flood risks with ease. The mean value of 3.67 suggests that the respondents agree the disaster management committee is assured of the effectiveness of flood prevention and relief information. The mean value of 3.44 reveals that the respondents have a neutral stance regarding the availability of information before, during, and after a flood.

The mean value of 3.39 indicates that the respondents have a neutral opinion on obtaining accurate information concerning evacuation methods during a flood event.

The mean value of 3.36 shows that the respondents are neutral about their ability to distinguish between fake and genuine information regarding floods. The mean value of 3.25 indicates that the respondents are neutral about the availability of flood relief information released by relevant organizations in a timely manner. The mean value of 2.99 suggests that the respondents are neutral regarding their understanding of the flood information disseminated by relevant organizations.

The overall mean value of 3.64 indicated that the respondents strongly concurred with the accuracy of the flood warning statements issued by the disaster management committee and the implementation of the flood prevention guidelines provided. Furthermore, the disaster management committee expressed confidence in the effectiveness of the flood prevention and relief information, as well as the early warning system, which is received from relevant organizations hours prior to the occurrence of a flood.

(C) Flood Experience

The ten flood experience questions presented in Table (4.5) are responses from 200 respondents regarding the most damaged and affected areas due to flooding in Hlaing Bwe Township.

Table (4.5) Flood Experience

No.	Description	Mean
1	It has experienced severe flooding in recent decades.	4.11
2	The region experiences annual flooding.	3.64
3	Homes and businesses experience flooding every year.	4.39
4	Annual flooding is experienced in agricultural and livestock areas.	3.45
5	The region experiences damage to infrastructure due to annual flooding.	4.25
6	The family suffered physical injuries due to flooding.	3.39
7	The family suffered from health problems due to flooding.	3.54
8	The family had to stop working due to flooding.	4.64
9	The flooding caused shortages of drinking water and food.	3.90
10	The flooding has caused a complete stop for businesses in the area.	3.99
	Overall Mean Value	**3.93**

Source: Survey Data (2025)

In reference to Table (4.5), the mean value of 4.64 indicates that the respondents have strongly agreed that their families had to cease work due to flooding. The mean value of 4.39 shows that the respondents agree their homes and businesses face flooding annually. The mean value of 4.25 illustrates that the respondents agree the region suffers damage to infrastructure as a result of yearly flooding. The mean value of 4.11 indicates that the respondents agree that they have experienced severe flooding in recent decades. The mean value of 3.99 reveals that the respondents agree that flooding has led to a complete halt of business operations in the area. The mean value of 3.90 indicates that the respondents concurred that flooding has led to shortages of drinking water and food. The mean value of 3.64 reflects that the respondents agreed that the region faces annual flooding. The mean value of 3.54 suggests that the respondents acknowledged that their families have suffered health issues due to flooding. The mean value of 3.45 reveals that the respondents maintain a neutral stance regarding the occurrence of annual flooding in agricultural and livestock areas. The mean value of 3.39 shows that the respondents neutrally indicated that their families have experienced physical injuries as a result of flooding.

The overall mean value of 3.93 revealed that the respondents strongly agreed that the region suffers damage to its infrastructure due to annual flooding. Additionally, the respondents reported having to cease work as a result of flooding. Consequently, the flooding has led to a complete halt of business operations in the area, while the respondents maintained a neutral position regarding the incidence of annual flooding in agricultural and livestock sectors.

(D) Flood Awareness

The ten flood awareness questions presented in Table (4.6) are responses from 200 respondents regarding their knowledge of flood preparedness, rescue drills, and related issues.

Table (4.6) Flood Awareness

No.	Description	Mean
1	Prepare to reduce flooding in residential areas and businesses.	4.01
2	Prepare the emergency bag with medicine, clothing, cash, and important documents.	3.73
3	The product will be stored on high ground to avoid flooding.	4.63
4	The elderly, the sick, and children will be moved to relief camps in advance to avoid flooding.	3.47
5	Flood barriers will be prepared in flood-prone areas with the community.	4.18
6	Attend disaster relief awareness training courses.	3.28
7	As the region experiences annual flooding, preparations and rescue drills will be conducted in collaboration with the community.	3.37
8	Disaster awareness will be disseminated to the community in the region.	4.73
9	Flood warnings issued by the disaster management committee will be disseminated to the community.	4.01
10	In the event of a flooding, the community will work together to ensure that relief actions in a short time.	4.00
Overall Mean Value		**3.94**

Source: Survey Data (2025)

As indicated in Table (4.6), the mean value of 4.73 demonstrates that the respondents strongly agreed that disaster awareness will be communicated to the community in the region. The mean value of 4.63 signifies that the respondents strongly agreed that products will be stored on elevated ground to prevent flooding. The mean value of 4.18 indicates that the respondents agreed that flood barriers will be established in flood-prone areas in collaboration with the community. The mean value of 4.01 shows that the respondents agreed on the necessity to prepare measures to mitigate flooding in residential areas and businesses. The mean value of 4.01 also indicates that the respondents agreed that flood warnings issued by the disaster management committee will be communicated to the community. The mean value of 4.00 reflects that the respondents agreed that in the event of flooding, the community will collaborate to ensure timely relief efforts.

The mean value of 3.73 indicates that the respondents agreed on the importance of preparing an emergency bag containing medicine, clothing, cash, and essential documents. The mean value of 3.47 shows that the respondents neutrally responded regarding the relocation of the elderly, sick, and children to relief camps in advance to avoid flooding. The mean value of 3.37 indicates that the respondents neutrally acknowledged that as the region experiences annual flooding, preparations and rescue drills will be conducted in partnership with the community. The mean value of 3.28 reflects that the respondents neutrally responded to the importance of attending disaster relief awareness training courses.

The overall mean value of 3.94 demonstrated that the respondents strongly agreed that the flood warnings issued by the disaster management committee are effectively communicated to the community, enabling preparations to mitigate flooding in residential areas and businesses. Moreover, community members are actively preparing flood barriers in areas prone to flooding and are collaborating on relief efforts in the event of a flood.

(E) Flood Disaster Management in Community

Table (4.7) shows the responses of 200 respondents to ten questions related to flood disaster management in the community.

Table (4.7) Flood Disaster Management in Community

No.	Description	Unit	Yes	No	Total
1	An early warning system for disasters.	Freq	169	31	200
		Percent	84.5%	15.5%	100%
2	Trained and operating organization in flood disaster preparedness, response, and early recovery.	Freq	144	56	200
		Percent	72.0%	28.0%	100%
3	Flood disaster risk reduction and recovery knowledge and capacities being passed on to children.	Freq	168	32	200
		Percent	84.0%	16.0%	100%
4	People interested in flood disaster risk reduction planning.	Freq	107	93	200
		Percent	53.5%	46.5%	100%

Table (4.7) Flood Disaster Management in Community (Continued)

No.	Description	Unit	Yes	No	Total
5	Emergency shelters and adequate facilities in the community for flood disaster.	Freq	166	34	200
		Percent	83.0%	17.0%	100%
6	Decision-making on land use and management take flood disaster risk into account.	Freq	97	103	200
		Percent	48.5%	51.5%	100%
7	The religious groups in the community involved and represented in community decision making for flood disaster risk reduction.	Freq	173	27	200
		Percent	86.5%	13.5%	100%
8	Disaster management committee play a leading role in coordinating preparedness, response and recovery.	Freq	159	41	200
		Percent	79.5%	20.5%	100%
9	Disaster management committee understand its powers and responsibilities.	Freq	197	3	200
		Percent	98.5%	1.5%	100%
10	Disaster management committee provide critical infrastructure and basic services.	Freq	200	0	200
		Percent	100%	0.0%	100%

Source: Survey Data (2025)

According to Table (4.7), 169 respondents, representing 84.5%, expressed their agreement with the implementation of an early warning system for disasters. Additionally, 144 respondents, or 56%, concurred that there should be trained organizations actively engaged in flood disaster preparedness, response, and early recovery efforts. Furthermore, 168 respondents, accounting for 84%, supported the idea of imparting knowledge and skills related to flood disaster risk reduction and recovery to children. Moreover, 107 respondents, which is 53.3%, agreed that there is a need for individuals interested in flood disaster risk reduction planning. A total of 166 respondents, or 83%, affirmed the necessity of having emergency shelters and adequate facilities within the community to address flood disasters.

Additionally, 173 respondents, representing 86.5%, agreed that religious groups within the community should be involved and represented in decision-making processes concerning flood disaster risk reduction. Furthermore, 159 respondents, or 79.5%, acknowledged the critical role of the disaster management committee in coordinating preparedness, response, and recovery efforts. An overwhelming 197 respondents, which is 98.5%, agreed that the disaster management committee comprehends its powers and responsibilities. All respondents concurred that the disaster management committee is responsible for providing essential infrastructure and basic services. However, it is noteworthy that 103 respondents, or 51.1%, did not agree that decision-making regarding land use and management adequately considers flood disaster risks.

Hlaing Bwe Township is relatively free from earthquakes and landslides due to its mountainous terrain. Due to the abundance of rivers in the area, when it rains heavily, the rivers overflow and cause flooding every year. The flooding occurs smoothly, allowing people to evacuate in time and the disaster period is short, so there is no major loss. The community faces significant risks related to natural disasters, which can lead to loss of life, displacement, and damage to property and infrastructure. This vulnerability underscores the importance of effective disaster management and community awareness initiatives. Understanding the natural disaster situation of this township is essential for addressing the needs of its residents, particularly in the context of disaster management and community resilience.

Hlaing Bwe Township is governed by local administrative bodies that work in conjunction with state and national authorities. Efforts are being made to enhance governance and community participation in decision-making processes, particularly in relation to disaster management and development planning. The township has a rich cultural heritage, with traditional practices and languages that reflect the unique identity of its communities. Community ties are strong, and social networks play a crucial role in supporting residents during times of crisis. Education and awareness programs are essential for fostering resilience and preparedness within the community. By fostering awareness and preparedness, the community can better navigate the challenges posed by natural disasters and work towards sustainable development.

CHAPTER V
CONCLUSION

5.1 Findings

The study was conducted the assessment of community awareness on disaster management in annual flood-prone areas of Hlaing Bwe Township, Kayin State. Flooding is the primary disaster that Kayin State faces, as it is traversed by several major rivers, including Thanlwin, Jaing, Attayan, Thaungyinn, Hawngthayaw, Zami, Hlaing Bwe, along with various creeks. The flooding zones in Hlaing Bwe Township can be categorized into three distinct areas: (i) regions along the Than Lwin River, which flows through the western and northwestern corners of Hlaing Bwe Township, (ii) areas along the upper section of Hlaing Bwe Chaung, encompassing Hlaing Bwe Town and the low-lying villages surrounding it, and (iii) regions along the lower part of Hlaing Bwe Chaung, which includes several villages along Paing Kyon Chaung that converge with Hlaing Bwe Chaung at Chaung Wa village in the Win Paya Village Tract.

Central disaster management is handled by Hlaing Bwe Township Disaster Preparedness Committee (TDPC). Four subcommittees have been formed to implement TDPC disaster management initiatives in local situations. News, Information, and Education, Emergency Evacuation, Search, and Rescue, Health, and Relief, Rehabilitation, and Reconstruction are these subcommittees. Township Disaster Management Plan guidelines have been created by Myanmar's government. The Hlaing Bwe Township Disaster Preparedness Committee drafted the Disaster Management Plan in April 2011 and revised it in May 2012 under the direction of the Kayin State and Hpa-An District Committees.

A sample of 200 rural individuals was selected using a random sampling method from four wards and four villages. The majority of respondents are from Kayin and Hlaing Bwe Township, which is their place of origin. The respondents have expressed strong agreement that the flood warning statements issued by the disaster management committee are accurate. They concur that the early warning system is communicated

by relevant organizations several hours before a flood occurs. The respondents support the implementation of flood prevention guidelines provided by the disaster management committee. They also agree that they read weather reports and easily understand flood risks. Furthermore, the respondents believe that the disaster management committee is confident in the effectiveness of the flood prevention and relief information provided.

The respondents have strongly agreed that their families have had to stop working due to flooding. They acknowledge that their homes and businesses are affected by flooding every year. The respondents agree that the region suffers damage to its infrastructure as a result of annual flooding. They also agree that they have experienced significant flooding in recent decades. The respondents concur that flooding has caused a complete cessation of business operations in the area. They noted that flooding has resulted in shortages of drinking water and food. The respondents agreed that the region faces flooding on an annual basis. They recognized that their families have encountered health issues due to flooding. The respondents strongly agreed that disaster awareness will be communicated to the community in the region. They also strongly agreed that products will be stored on elevated ground to prevent flooding.

The respondents agreed that flood barriers will be constructed in flood-prone areas in collaboration with the community. They acknowledged the importance of preparing measures to mitigate flooding in residential areas and businesses. The participants concurred that flood alerts issued by the disaster management committee will be conveyed to the community. The participants also agreed that in the case of flooding, the community will work together to ensure prompt relief efforts. They recognized the significance of preparing an emergency bag that includes medicine, clothing, cash, and vital documents. The majority of participants expressed their agreement with the establishment of an early warning system for disasters. Moreover, there should be trained organizations actively involved in flood disaster preparedness, response, and early recovery initiatives.

Additionally, most participants supported the concept of educating children about flood disaster risk reduction and recovery strategies. Furthermore, a significant number of respondents acknowledged the necessity for individuals interested in flood disaster risk reduction planning. Most participants affirmed the importance of having emergency shelters and sufficient facilities within the community to manage flood

disasters. Moreover, most participants agreed that religious organizations within the community should be included and represented in decision-making processes related to flood disaster risk reduction. Furthermore, the majority of respondents recognized the essential role of the disaster management committee in coordinating preparedness, response, and recovery activities. Most participants agreed that the disaster management committee understands its powers and responsibilities. All respondents unanimously agreed that the disaster management committee is tasked with providing essential infrastructure and basic services.

Hlaing Bwe Township is largely insulated from earthquakes and landslides owing to its mountainous landscape. However, the region's numerous rivers lead to annual flooding during heavy rainfall, as the rivers tend to overflow. Fortunately, the flooding occurs in a manner that allows residents to evacuate promptly, resulting in a brief disaster period and minimal losses. Nonetheless, the community is exposed to considerable risks associated with natural disasters, which may result in fatalities, displacement, and damage to property and infrastructure. This susceptibility highlights the necessity for effective disaster management and initiatives aimed at raising community awareness. Gaining an understanding of the natural disaster landscape in this township is vital for addressing the needs of its inhabitants, especially concerning disaster management and community resilience.

Hlaing Bwe Township is administered by local governing bodies that collaborate with state and national authorities. There are ongoing efforts to improve governance and encourage community involvement in decision-making processes, particularly regarding disaster management and development planning. The township boasts a rich cultural heritage, with traditional practices and languages that embody the distinct identity of its communities. Strong community bonds and social networks are instrumental in providing support to residents during crises. Education and awareness initiatives are crucial for building resilience and preparedness within the community. By promoting awareness and readiness, the community can more effectively confront the challenges posed by natural disasters and strive for sustainable development.

5.2 Suggestions

Raising community awareness about disaster management in flood-prone regions such as Hlaing Bwe Township is crucial for fostering resilience and preparedness. There are several suggestions to effectively enhance awareness and

engage the community. Arrange regular workshops and seminars that concentrate on disaster preparedness, response strategies, and recovery processes. Invite specialists to impart knowledge and share best practices. Implement educational initiatives in local schools that instruct students on disaster management. Motivate them to communicate their learnings with their families. Conduct community-wide disaster drills to rehearse evacuation procedures and response actions. This practical experience can greatly improve preparedness.

Collaborate with local emergency services to facilitate these drills, ensuring that community members comprehend their roles during an actual disaster. Encourage the establishment of local disaster response teams that can spearhead awareness efforts and coordinate community responses during emergencies. Create community groups on social media platforms or messaging applications to disseminate information and updates regarding disaster management. Develop or promote existing mobile applications that deliver real-time alerts and information about floods and disaster preparedness. Establish a dedicated website or social media page that provides resources, tips, and updates related to disaster management. Create brochures, flyers, and posters that convey essential information on flood risks, preparedness tips, and emergency contacts. Distribute these materials in public areas and community centers. Collaborate with information stations and newspapers to disseminate information about disaster management and upcoming events.

Work alongside local leaders, religious figures, and respected community members to advocate for disaster management initiatives. Their influence can significantly enhance community participation. Identify and train community members to serve as ambassadors for disaster management who can lead discussions and awareness campaigns. Regularly evaluate the community's awareness and understanding through surveys to pinpoint deficiencies and opportunities for enhancement. Establish avenues for community members to offer feedback on disaster management efforts and share their personal experiences.

Partner with non-governmental organizations and governmental bodies that focus on disaster management to utilize their expertise and resources. Collaborate on community initiatives, training programs, and awareness campaigns to optimize impact. Arrange events to distribute emergency preparedness kits containing essential items, such as first aid supplies, food, water, and critical documents. Disseminate information on how to assemble a personal emergency kit and emphasize the

significance of having one readily available. Conduct an annual disaster preparedness day featuring activities, demonstrations, and information booths to engage the community and enhance awareness. Provide incentives, such as rewards or recognition, for community members who actively engage in awareness initiatives. By executing these strategies, Hlaing Bwe Township can cultivate a culture of preparedness and resilience, empowering community members to effectively handle disaster risks and respond to flooding.

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APPENDIX

SURVEY QUESTIONNAIRE

I am studying Master of Development Studies at Yangon University of Economics. I have designed the following questionnaire for "**Assessment of Community Awareness on Disaster Management in Annual Flood-Prone Areas (A Case Study of Hlaing Bwe Township)**" which is an integral part of the study to complete the Master Degree.

Please rest assured that all responses will be kept confidential, and no individual information will be disclosed. Completing this questionnaire will take approximately 20 minutes. Read the questions and mark your response with a tick in the provided box. Thanks for your participation.

Part (A) Characteristics of Respondent

1. Gender (a) Male × (b) Female ×
2. Completed Age
   (a) 21 years to 30 years × (b) 31 years to 40 years ×
   (c) 41 years to 50 years × (d) 51 years to 60 years × (e) Above 60 years
3. Marital Status (a) Single × (b) Married × (c) Widow/Widower ○ (d) Divorced ○
4. Education Level (a) Undergraduate × (b) Graduate × (c) Postgraduate ×
5. Religion (a) Buddhist × (b) Hindu × (c) Christian × (b) Islam ×
6. Nationality
   (a) Kachin × (b) Kayah × (c) Kayin × (d) Chin × (e) Mon ×
   (f) Myanmar × (f) Rakhine × (g) Shan × (h) Other ×
7. Occupation
   (a) Government employee × (b) Private employee × (c) Agriculture ×
   (d) Farming × (e) Fishing × (f) Trading × (g) Other ×
8. Native (a) Hlaing Bwe Township × (b) Other Township ×
9. Duration of stay in Hlaing Bwe Township
   (a) Less than 5 years × (b) 5 years to 15 years × (c) More than 15 years ×
10. Number of family members
    (a) Less than 5 × (b) More than 5 ×

Part (B) Flood Information

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

No.	Description	1	2	3	4	5
1.	Information is available before, during, and after a flood.					
2.	Obtain accurate information regarding evacuation methods during a flood event.					
3.	Early warning system is received from relevant organizations hours before a flood occurs.					
4.	Ability to identify fake and real information about floods.					
5.	Read weather reports and easily understand flood risks.					
6.	Understand the flood information released by relevant organizations.					
7.	Information on flood relief released by relevant organizations is available within a short time.					
8.	The disaster management committee flood warning statements are accurate.					
9.	The disaster management committee is confident in the effective flood prevention and relief information.					
10.	Implement flood prevention guidelines issued by the disaster management committee.					

Part (C) Flood Experience

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

No.	Description	1	2	3	4	5
1.	It has experienced severe flooding in recent decades.					
2.	The region experiences annual flooding.					
3.	Homes and businesses experience flooding every year.					
4.	Annual flooding is experienced in agricultural and livestock areas.					
5.	The region experiences damage to infrastructure due to annual flooding.					
6.	The family suffered physical injuries due to flooding.					
7.	The family suffered from health problems due to flooding.					
8.	The family had to stop working due to flooding.					
9.	The flooding caused shortages of drinking water and food.					
10.	The flooding has caused a complete stop for businesses in the area.					

Part (D) Flood Awareness

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

No.	Description	1	2	3	4	5
1.	Prepare to reduce flooding in residential areas and businesses.					
2.	Prepare the emergency bag with medicine, clothing, cash, and important documents.					
3.	The product will be stored on high ground to avoid flooding.					
4.	The elderly, the sick, and children will be moved to relief camps in advance to avoid flooding.					
5.	Flood barriers will be prepared in flood-prone areas with the community.					
6.	Attend disaster relief awareness training courses.					
7.	As the region experiences annual flooding, preparations and rescue drills will be conducted in collaboration with the community.					
8.	Disaster awareness will be disseminated to the community in the region.					
9.	Flood warnings issued by the disaster management committee will be disseminated to the community.					
10.	In the event of a flooding, the community will work together to ensure that relief actions in a short time.					

Part (E) Flood Disaster Management in the Community

1. Does the community have an early warning system for disasters?
   (a) Yes × (b) No ×
2. Does the community have a trained and operating organization in flood disaster preparedness, response, and early recovery?
   (a) Yes × (b) No ×
3. Are the flood disaster risk reduction and recovery knowledge and capacities being passed on to children?
   (a) Yes × (b) No ×
4. Are the community people interested in flood disaster risk reduction planning?
   (a) Yes × (b) No ×
5. Are there emergency shelters and adequate facilities in the community for flood disaster?
   (a) Yes × (b) No ×
6. Does the community decision-making on land use and management take flood disaster risk into account?
   (a) Yes × (b) No ×
7. Are the religious groups in the community involved and represented in community decision making for flood disaster risk reduction?
   (a) Yes × (b) No ×
8. Does the disaster management committee play a leading role in coordinating preparedness, response and recovery?
   (a) Yes × (b) No ×
9. Does the disaster management committee understand its powers and responsibilities?
   (a) Yes × (b) No ×
10. Does the disaster management committee provide critical infrastructure and basic services?
    (a) Yes × (b) No ×