Baseline Study Report

Community-Led Early Action and Resilience (CLEAR) Project in Makassar

Submitted to : INANTA

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List of Abbreviations

BMKG	Badan Meteorologi, Klimatologi, dan Geofisika
BPBD	Badan Penanggulangan Bencana Daerah
CCA	Climate Change Adaptation
CLEAR	Community-Led Early Action and Resilience
CSO	Civil Society Organization
CVCA	Community-based Vulnerability and Capacity Assessment
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction Management
EWS	Early Warning System
FGD	Focus Group Discussion
FPRB	Forum Pengurangan Risiko Bencana
GEDSI	Gender Equity, Disability and Social Inclusion
HCFM	Handling Complaint and Feedback Mechanism
MEAL	Monitoring Evaluation and Learning
MSMEs	Micro, Small, Medium-sized Enterprises
NGO	Non-Government Organization
PwD	People with Disability
SIMEX	Simulation Exercises

BASELINE STUDY REPORT

THE COMMUNITY-LED EARLY ACTION AND RESILIENCE (CLEAR) PROJECT IN MAKASSAR

I. Executive Summary

INANTA and CWS Indonesia are developing an Early Action project as part of Climate Change Adaptation (CCA). This program is called the Community-Led Early Action and Resilience (CLEAR) and was planned for three years, targeting four sub-districts in Makassar City. The CLEAR program has three main outcomes, i.e.: (1) Knowledge, understanding, motivation, and ability of community members to improve the assessment capacity on the climate and disaster vulnerability and to act independently (2) Projected disaster impacts can be mitigated proactively through the implementation of successful anticipatory action and strengthening the early warning system (EWS), and (3) Increasing community access to alternative livelihoods in reducing the impact of disasters and other triggers of displacement.

A mixed-method approach was used for the baseline study, including qualitative desk reviews, interviews, and field discussions. It revealed that the target sub-districts are vulnerable to hydrometeorological disasters like floods, droughts, and tornadoes. The study also found a need for improved public knowledge and understanding of climate change adaptation and anticipatory action.

Based on the findings and results of the analysis, all target sub-districts are areas vulnerable to the threat of hydrometeorological disasters such as floods, droughts, and tornadoes with a high category of disaster risk, as well as drought with a moderate category of risk. Apart from that, public knowledge and understanding regarding disaster risk reduction and climate change adaptation, including anticipatory action or early action for disaster management, still need to be improved. Communities from the four sub-districts have felt the impacts of climate change, such as long-term temperature changes, rain patterns, extreme weather, and air quality. In the aspect of public knowledge related to disaster risk reduction and climate change adaptation, it is illustrated that of the 81.7% of the public who have received information about climate change and disaster risk reduction, but only around 42.5% claim to have a good understanding of this. 89.5% of people stated that the impact of climate change has occurred in their environment in the form of droughts and floods, changes in temperature and air quality. This shows that even though there is a low understanding of the context of disaster and the definition of climate change and anticipatory action, the community understands and feels the direct impact of climate change. The public also understands that disasters caused by climate change and the most frequent disasters that impact people's lives and quality of life are floods and droughts.

In addition, in the institutional aspects and community preparedness stages, it was identified that not all communities at the target village level had risk mapping documents, planning, and procedures related to anticipatory action, Mitigation on Climate Change Adaptation (MAPI), and DRR.

In this study, there are two main points that are underlined in developing strategies for implementing anticipatory action projects in the future. Including gender equality, disability, and social inclusion (GEDSI). Involvement of groups of young people and women and opportunities to integrate anticipatory action, CCA, and DRR at the city and sub-district levels. This certainly needs to be developed to increase the impact, effectiveness, efficiency, and sustainability of the CLEAR project.

II. Introduction

A. Project Introduction

The proposed project aims to establish community resilience through strengthening community-led disaster preparedness, early action, and adaptive measures to climate risks and disasters. The project will facilitate capacity-building activities based on community needs and promote the implementation of anticipatory actions to mitigate disaster impacts. The main activities include climate vulnerability assessments, knowledge-sharing sessions, sponsorship of climate mitigation and adaptation actions proposed by the community, establishment of disaster risk reduction (DRR) structures, development of community-based hazard risk information and early warning systems, and facilitation of participatory planning for adaptation options. The project's three phases involve raising awareness and knowledge, developing anticipatory action plans, and initiating small-scale climate change adaptation initiatives. The project duration is three years, focusing on community empowerment, technical support, and the implementation of anticipatory actions and livelihood adaptations.

B. Objectives

The objectives of the baseline study are as follows:

- To establish a baseline understanding of the current state of community resilience in Makassar.
- To identify the existing knowledge, attitudes, and practices related to disaster preparedness and climate change adaptation among community members.
- To assess the capacity and resources available within the community to implement early action measures.
- To identify the vulnerabilities and key challenges faced by the community concerning disaster impacts and climate risks.
- To provide a benchmark for monitoring and evaluating the progress and impact of the CLEAR project.

C. Scope

The baseline study focused on the following key areas:

- Community profiles and demographics in the project area.
- Existing disaster preparedness and early action initiatives in the community.
- Knowledge, attitudes, and practices related to disaster preparedness and climate change adaptation.
- Community perceptions of vulnerabilities, risks, and impacts of disasters and climate change.
- Available resources, capacities, and institutional frameworks for disaster risk reduction and climate adaptation.
- Livelihood patterns and economic activities in the community.
- Existing community networks, organizations, and social structures are relevant to disaster resilience.

III. Methodology

The baseline study employed qualitative and quantitative research methods to gather comprehensive data. Participatory mapping and assessment tools involved community members in identifying vulnerable areas, hazards, and potential early action options. The following methods were used[1]:

1. **A review of existing literature**, reports, documents, and data sets related to disaster risk reduction, climate adaptation, vulnerabilities, and development in Makassar will be reviewed.
2. **Key informant interviews** with relevant stakeholders, including community leaders, local government representatives, and civil society organizations to understand their perspectives on climate change risks and existing initiatives.
3. **Focus group discussions** with community members and other selected stakeholders to assess their experiences, knowledge, attitudes, practices, and needs regarding disaster preparedness and climate adaptation.
4. **Household surveys** to collect quantitative data on demographics, livelihoods, and perceptions of vulnerabilities and risks. A representative sample of households in the target communities will be surveyed to gather information on their socio-economic status, climate change perceptions, vulnerabilities, and existing coping mechanisms.
5. **Field observations** to assess the physical environment and infrastructure in the project area.

Table 1 Number of Respondents

Methods	Respondent	# Actual Respondent
FGD	Community/village representatives	Focus Group Discussions (FGDs) were conducted twice, divided by sub-districts: Biringkanaya Sub-district, consisting of Katimbang and Pacerakkang Villages: Female participants: 15 Male participants: 6 Total: 21 Manggala Sub-district, consisting of Tamangapa and Manggala Villages: Female participants: 12 Male participants: 12 Total: 24 The overall total number of FGD participants is 45 people (27 females and 18 males).
KII	1. Head of village 2. Head of community organization	1. Head of Village: 4 2. Head of community

[1] see annexes for detail information

	3. BPBD 4. Dinas Sosial 5. BMKG 6. Local NGO/CSO 7. PwD	organization/religious leader: 3 3. BPBD : 2 4. Dinas Sosial: 2 5. BMKG: 1 6. Local NGO: 1 7. People with Disability: 4
Survey	Potential beneficiaries targeted in 4 villages	485 respondents in 4 villages: Tamangapa: 62 respondents Manggala: 125 respondents Katimbang: 174 respondents Pacerakkang: 124 respondents
Total Respondent		**547**

The activity phases of the baseline study involve a systematic approach to gather relevant information and analyze it for the purpose of establishing a baseline understanding of the situation. The first phase, document review, involves examining existing documents and literature related to the study topic. This helps in gaining background knowledge and identifying gaps in the existing information.

The second phase focuses on preparing the necessary tools and logistics for the study, ensuring that the fieldwork can be carried out effectively. This includes designing questionnaires, organizing interviews and discussions, and making arrangements for field visits.

The third phase involves collecting primary data through surveys, KIIs, FGDs, and observations. Surveys are commonly used to gather quantitative data from a large sample of respondents. KIIs involve conducting structured interviews with individuals who possess specialized knowledge or experience relevant to the study. FGDs provide a platform for group discussions and obtaining qualitative insights from participants. Observations involve direct observation of the study area and its surroundings.

Once the data is collected, the fourth phase focuses on analyzing the findings. This involves organizing, interpreting, and synthesizing the data to identify patterns, trends, and key insights. Various analytical techniques and tools may be used depending on the nature of the data.

The final phase involves writing the study report. This report summarizes the objectives, methodology, findings, and conclusions of the baseline study. It serves as a comprehensive document that provides a basis for future actions, interventions, or further research.

Overall, the activity phases of the baseline study ensure a systematic and rigorous approach to gather and analyze data, leading to a comprehensive understanding of the study topic and providing a solid foundation for decision-making and planning.

A. Limitation in Data Collection

During the baseline study, which spanned from December 2023 to January 2024, several challenges were encountered that affected data collection. These challenges can be summarized as follows:

- Changes in department heads, specifically in DLH (Environmental Agency) and Bappeda (Regional Development Planning Agency), resulted in a lack of authorization for interviews from these agencies. This situation potentially hindered the acquisition of information from these specific entities, potentially impacting the study's comprehensiveness.
- Inclement weather, characterized by heavy rainfall, occurred throughout the data collection period. The severe weather conditions had an adverse effect on participant attendance in the Focus Group Discussions (FGDs), which may have impeded the study's capacity to effectively gather data.
- The study coincided with an election campaign process, wherein certain key informants were either candidates themselves or part of successful campaign teams. Consequently, their involvement in party activities necessitated their participation, potentially affecting their availability and engagement as informants for the study.

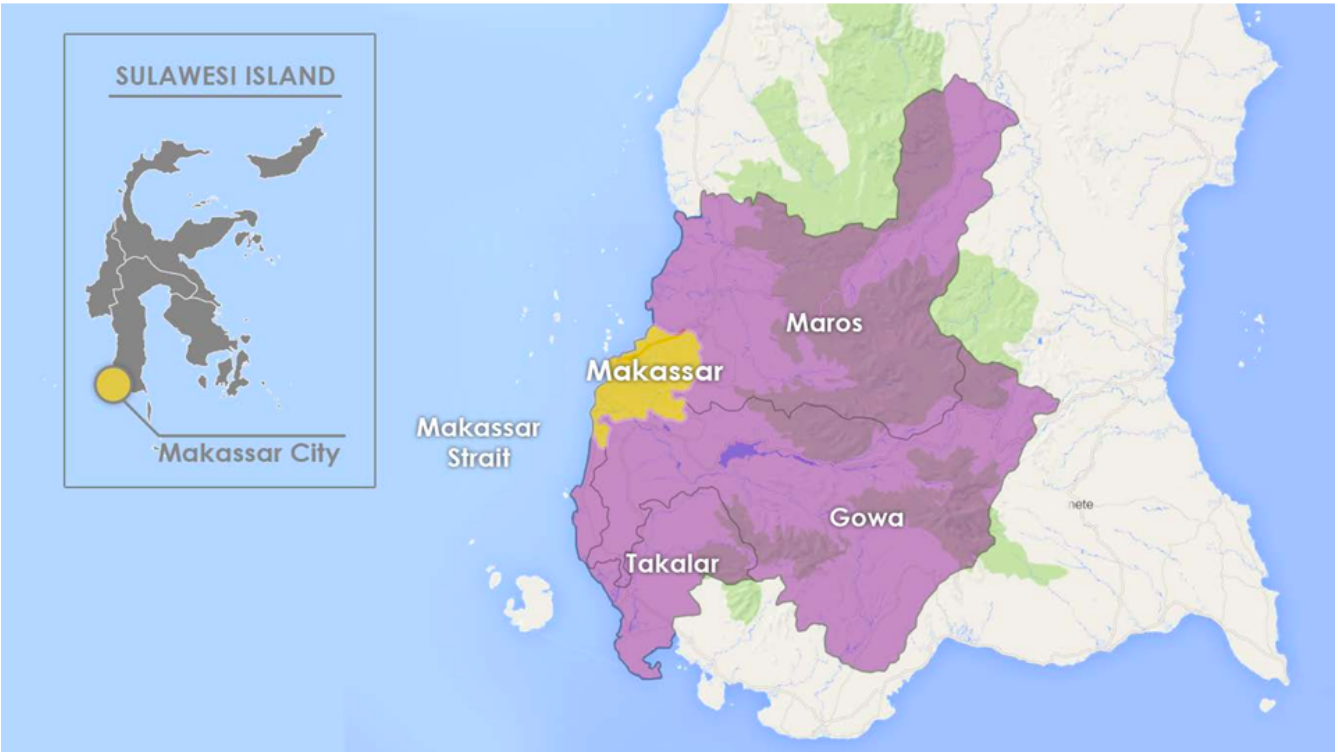
Overall, despite the limitations encountered during the study, the collected data is deemed sufficient to adequately represent the data and information needs of this study.

IV. Findings and Analysis

This section will discuss the findings of data and analysis encompassed in the social-economic, political, and environmental context; urban ecosystem; urban governance system; urban economy; analysis of community vulnerability and capacities; and assessment of coping mechanisms and adaptation strategies. This is closely related to the context of Makassar City as a port city and the administrative and economic center of South Sulawesi.

A. Social, Economic, Political, and Environmental Context

Figure 1 Location of Makassar on the island of Sulawesi and with the neighboring districts of Takalar, Gowa, and Maros



Source: Google Maps redesigned

Makassar is the capital city of South Sulawesi Province, which is located on the southwest coast of Sulawesi Island. It is the most populous city in the region, with a population estimated at 1,673,094 in 2023. The city's population has been growing steadily, with an estimated 15.52% of the population of South Sulawesi residing in Makassar. Among this population, 12.6% live in extreme poverty (less than USD 1/day), and 25% live in poverty (less than USD 2/day), according to UN indicators. The labor force participation rate in Makassar is relatively low, especially for women, and the unemployment rate reached 15.92% in 2020 due to the lack of labor-intensive industries and the availability of skills training programs.

Geographically, Makassar covers an area of 175.77 km2 and is characterized by a tropical monsoon climate with an average temperature of 27.5°C. The city experiences significant rainfall, with the highest, from November to

April. The area is also prone to flooding, and the city's low-lying topography makes it vulnerable to the impacts of climate change, including rising sea levels.

The city's population is multi-ethnic, with the majority being ethnic Bugis or Makassarese. The remainder of the population includes Torajans, Mandarese, Butonese, Chinese, and Javanese. The city is a cultural and economic hub, experiencing a building boom and hosting various religious and cultural festivals.

The city's rapid population growth, coupled with high levels of poverty and vulnerability to climate change, presents significant challenges for local authorities and policymakers.

Geographically, the area of Makassar City is 175.77 km2. Three major rivers flow through the city: the Maros River in the north, the Tallo River in the central part, and the Jeneberang River in the south. The climate of Makassar is a tropical monsoon with an average temperature of 27.5°C (highest temperature is 32.5°C and lowest temperature is 22.5°C). The average rainfall intensity is 3,137 mm per year, with the highest rainfall from November to April. In addition, the National Disaster Management Agency (BNPB) recorded the highest rainfall in South Sulawesi in 2019 at 3,669.00 mm, which occurred in Makassar. Thus, Makassar is classified as an area with high rainfall in South Sulawesi.

The Asian Development Bank (ADB) states that the intensity of rainfall during the rainy season in Makassar has increased and will increase the potential for flooding in the future. Therefore, river basins, especially those near major rivers, become flood-prone areas. The ADB has identified climate change and rainfall as key components of climate change. The ADB also adds that sea level rise is another key element. Most of the Makassar area is low-lying.

The average elevation of western Makassar is 0-5 m, while in the eastern and northern parts, it is 5-25 m. Between 1993 and 2022, sea levels have risen by up to 7.5 cm and are predicted to reach 88.16 cm by 2025, 1.14 m by 2050, and 1.44 m by 2100. Therefore, these main areas contribute to migration and infrastructure damage, affecting fishing, the marine economy, and agriculture, increasing diseases, reducing access to clean water; and contributing to natural hazards.

Based on the Risk Assessment Document for South Sulawesi 2022 - 2026, there are 13 potential hazards: Floods, Flash floods, Extreme weather, Extreme waves and abrasion, Earthquakes, Liquefaction, Forest and land fires, Drought, Landslides, Tsunamis, Epidemics and disease outbreaks, Technological failures, and Covid-19. Meanwhile, for the city of Makassar, the potential hazards include Floods, Extreme weather, Extreme waves and abrasion, Earthquakes, Drought, Tsunamis, Epidemics and disease outbreaks, Technological failures, and the Covid-19 pandemic, with their respective hazard parameters and vulnerabilities as follows:

Table 2 Hazard and vulnerabilities parameters

Types of Data	Hazard Parameters	Vulnerability Parameters
Floods	High	High
Extreme Weather	High	High
Extreme Waves and Abrasion	High	Moderate
Earthquakes	Low	Low
Drought	Moderate	Moderate
Tsunamis	Low	Moderate

Epidemics and Disease Outbreaks	Low	Low
Technological Failures	Low	Low
COVID-19 Pandemic	High	Low

Overall, there are nine potential hazards in Makassar identified by BNPB, ranging from low to high risk. Earthquakes, tsunamis, epidemics and diseases, and technological failures are categorized as low risk, drought is considered moderate risk, and floods, extreme weather, extreme waves, and abrasion, and COVID-19 are considered high risk. In February 2023, floods occurred in eight sub-districts. This resulted in 2,293 people (681 families) being displaced and 681 houses being flooded. The increased rainfall and flooding are affecting Makassar residents in various ways. The uncoordinated drainage system in some city sub-districts, such as Tamalanrea, Biringkanaya, and Manggala, results in severe flooding[2]. The urban poor who live along the coast are among the most vulnerable to climate change, threatening their livelihoods and physical safety and compounding their existing social vulnerabilities of lacking access to water and low income[3]. Tidal floods and storm surges also threaten coastal communities, and seawater flooding is another key concern for the city government regarding climate change impacts[4]. Every year, during January and February, there is an increasing number of reported inland and coastal floods, according to the local disaster prevention agency (BPBD)[5]. Floods rarely last more than 48 hours, but the city's capacity to respond has consistently been exceeded by the growing number of communities affected by floods. The floods have resulted in the displacement of residents, damage to infrastructure, and loss of livelihoods. The floods are triggered by high-intensity rainfall accompanied by rising sea levels, and the intensity of rainfall during the rainy season in Makassar has increased, increasing the potential for flooding in the future[6]. Residents of Makassar are also affected by clogged drainage factors, which cause puddles and exacerbate flooding.

The government and stakeholders in Makassar have been taking steps to improve the city's disaster management and reduction capacity. These efforts include the following:

1. **Establishment of the Disaster Management Agency**. The Makassar Government established the Disaster Management Agency to coordinate and command all disaster management efforts in the city. This was done by issuing Mayor Decree No. 20/2010, which led to the effective coordination of disaster management activities. The establishment of the Disaster Management Agency by the Makassar Government demonstrates a proactive approach to disaster management. By centralizing the coordination and command of disaster management efforts, the agency can effectively streamline and optimize response measures. The issuance of Mayor Decree No. 20/2010 serves as a legal framework that empowers the agency to carry out its responsibilities and ensures a systematic approach to disaster management in the city. This initiative highlights the government's commitment to enhancing disaster preparedness and response capabilities,

[2] Harifuddin et al., ***Flood Disaster and Risk Anticipation Strategy***, February 2019, IOP Conference Series Earth and Environmental Science 235:012032
[3] UN-Habitat Regional Office for Asia and the Pacific-Fukuoka United Nations Human Settlements Programme, ***Makassar Indonesia Climate Change Vulnerability Assessment***, HS Number: HS/038/14E ISBN Number (Series): 978-92-1-132400-6 ISBN Number (Volume): 978-92-1-132620-8
[4] ibid.
[5] AHA Centre, Indonesia, ***Flooding in Makassar City (South Sulawesi Province), (February 13,b 2023)***, AHADID : AHA-FL-2023-000148-IDN
[6] VOI, ***BMKG: The Rob Flood In Makassar City Was Triggered By Sea Waves Rising To A Height Of 4 Meters***, 13 Februari 2023, 22:17

ultimately aiming to safeguard the well-being of the community and minimize the impact of disasters in Makassar.

2. **Budget Allocation**. The Makassar Government allocated a budget for Disaster Risk Reduction Management (DRRM) of USD 84,2700 (IDR 1.298.347.890), which is as much as 0.06% of the total official budget of the Makassar Government. This budget was extracted from the firefighter department, which has a division for disaster emergencies[7]. The budget allocation of USD 84,2700 (IDR 1.298.347.890) for Disaster Risk Reduction Management (DRRM) indicates the Makassar Government's commitment to addressing and mitigating the risks associated with disasters. Despite constituting a relatively small proportion of the total official budget (0.06%), this allocation showcases the government's recognition of the importance of allocating financial resources specifically for disaster management. By sourcing the budget from the firefighter department's division for disaster emergencies, the government acknowledges the interconnectedness between firefighting and emergency response activities, emphasizing the need to allocate funds to ensure preparedness and effective response measures. This budget allocation demonstrates the government's prioritization of disaster risk reduction and management as a crucial aspect of governance in Makassar.
3. **Disaster Prevention, Emergency Response, and Rehabilitation**. The Makassar Government focuses on a series of efforts covering disaster prevention, emergency response, and rehabilitation[8]. The Makassar Government's focus on disaster prevention, emergency response, and rehabilitation reflects its comprehensive approach to addressing the various stages of disaster management. By prioritizing disaster prevention, the government aims to reduce the likelihood and severity of disasters through proactive measures such as risk assessment, infrastructure planning, and public awareness campaigns. The emphasis on emergency response signifies the government's commitment to promptly and effectively addressing the immediate needs of affected communities during and after disasters, including search and rescue operations, medical assistance, and distribution of essential supplies. Additionally, the focus on rehabilitation highlights the government's commitment to long-term recovery and rebuilding efforts, including infrastructure restoration, livelihood support, and psychosocial assistance to affected individuals and communities. By adopting this holistic approach, the Makassar Government demonstrates its dedication to comprehensive disaster management, aiming to safeguard the well-being and resilience of its residents in the face of natural or man-made disasters.
4. **School Disaster Preparedness Campaign**. The campaign aims to promote disaster preparedness and disaster risk reduction among schoolchildren. The Makassar Government has initiated this program, which has been well-received by the public[9]. The School Disaster Preparedness Campaign initiated by the Makassar Government demonstrates its commitment to fostering a culture of preparedness and resilience among the younger generation. By targeting schoolchildren, the campaign aims to instill valuable knowledge and skills related to disaster preparedness and risk reduction, equipping them with the ability to respond effectively in times of emergencies. This proactive approach recognizes the importance of empowering and educating

[7] Op. Cit. UN-HABITAT
[8] PreventionWeb, ***Makassar, Indonesia Local progress report on the implementation of the Hyogo Framework for Action (First Cycle)***, https://www.preventionweb.net/files/31613_LGSAT_5HFA-Makassar(2011-2013).pdf, accessed on December 27, 2023
[9] ibid.

young individuals as key stakeholders in disaster management. The positive reception from the public indicates the recognition of the campaign's significance and the community's support for initiatives that prioritize the safety and well-being of schoolchildren. This program not only contributes to the immediate preparedness of students but also sets the foundation for a more resilient future generation that is better equipped to face and mitigate the impact of disasters in Makassar.

5. **Multi-Sectoral Platform for Disaster Risk Reduction**. The Makassar Government's active participation in national Disaster Risk Reduction (DRR) planning demonstrates its commitment to collaborative efforts in addressing and mitigating disaster risks. By engaging in the Provincial multi-sectoral platform for disaster risk reduction, the government recognizes the importance of involving various sectors and stakeholders in developing effective strategies and policies. This multi-sectoral approach allows for a comprehensive and coordinated response to disaster risks, taking into account the diverse expertise and perspectives of different sectors. The local government's significant involvement in Provincial DRR planning indicates its dedication to contributing to the collective efforts in disaster risk reduction at a national level. The progress achieved in four out of five areas signifies tangible advancements made by the government in implementing DRR measures and highlights its commitment to continuous improvement in disaster management.

   There are 5 criteria for measuring Disaster Risk Reduction (DRR), and Makassar fulfills 4 out of 5. These are based on the SIMEX (Simulation Exercises)[10] which include:

   a. **Identification and measuring disaster risk**. Makassar has likely made progress in identifying and measuring disaster risks, which is an important step in developing effective DRR strategies.
   b. **Education and knowledge development**. Makassar has likely taken steps to promote education and knowledge development related to disaster risk, ensuring that the community is better prepared and informed.
   c. **Informing people about their risk (awareness raising)**. Makassar has likely implemented initiatives to raise awareness among the population about their risk of disasters. This helps individuals and communities take appropriate measures to mitigate and respond to potential hazards.
   d. **Incorporating DRM into national planning and investment**. Makassar has likely integrated disaster risk management (DRM) considerations into national planning and investment processes. This ensures that DRR measures are taken into account in development plans and resource allocation.
   e. **Strengthening institutional and legislative arrangements**. The information does not specify whether Makassar fulfills this criterion. However, strengthening institutional and legislative arrangements involves establishing effective governance structures, policies, and laws to support DRR efforts.

   Through these collaborative initiatives, the Makassar Government strengthens its capacity to mitigate, respond to, and recover from disasters, ultimately enhancing the resilience and well-being of its community.

6. **Strengthening Data Systems**. The focus on strengthening data systems by the Makassar Government highlights the recognition of the crucial role that data plays in effective governance and decision-making. By improving data management and minimizing manual data entry processes, the government aims to enhance

[10] PreventionWeb, **Conducting simulation exercises**, https://www.preventionweb.net/conducting-simulation-exercises, accessed on January 19, 2024

the efficiency and accuracy of data collection, storage, and analysis. This streamlining of data systems enables timely access to reliable information for decision-making processes, increasing the government's capacity to respond effectively to various challenges and make informed policy choices. The development of real-time data collection systems signifies the government's commitment to utilizing up-to-date information to guide their actions and strategies. Additionally, the initiative to have each sector initiate their own data systems, with support from the Communication and Information Department, promotes sector-specific data collection and analysis, ensuring the availability of relevant and targeted information for each area of governance. These efforts collectively contribute to evidence-based decision-making, efficient resource allocation, and improved overall governance in Makassar[11].

7. **United Tractors' UTACTION Program**. United Tractors has implemented its UTACTION (United Tractors for Emergency Response and Action) program in Makassar, mobilizing volunteers to support employees' families and affected communities during emergencies[12].

Furthermore, stakeholders' capacity for disaster management and reduction remains limited, resulting in increased risks, particularly for the impoverished population, specifically those in slum areas.

They are vulnerable due to their low economic capacity and education level, especially their limited knowledge of risk-based decision-making and lack of preparedness due to climate migration or forced relocation to other cities. The impact is also worse for vulnerable groups, such as women, children, persons with disabilities, and LGBTQ+ individuals, as most of them are not involved in discussions and policy-making processes related to these issues.

Despite several weaknesses, these initiatives demonstrate the city's dedication to improving its disaster management and reduction capabilities and its endeavors to tackle the difficulties arising from climate change and its accompanying risks.

Therefore, this project is developed and proposed to promote the participation of the poor and vulnerable communities in understanding hazards, vulnerabilities, and capacities, strengthen early warning systems, and implement climate change adaptation (CCA) actions, including anticipatory actions to reduce/mitigate disaster impacts, so that communities can have resilience in facing disasters, climate change, and livelihood challenges.

1. Urban Ecosystem

The Makassar Strait ecosystem is complex and abundant, with nearby islands and coastal areas with mangrove forests, mudflats, and coral reefs providing optimal conditions for marine biodiversity and coastal livelihoods. The Makassar Strait is a unique oceanic ecosystem influenced by Indonesian waters, and the distribution of phytoplankton species should not be limited by the strait[13]. The city of Makassar lies on a relatively flat topography with hills to the east of the city, which create natural water catchment areas with semi-dense

[11] JSI - USAID, ***BUILDING HEALTHY CITIES Multisector Healthy City Action Plan: Makassar***, June 2022, Version 3
[12] United Tractors, ***Strengthening Initiatives and Strategies for Social Responsibility Implementation, UT Makassar Branch Carried Out Flood Disaster Relief Aid in Makassar***, https://www.unitedtractors.com/en/strengthening-initiatives-and-strategies-for-social-responsibility-implementation-ut-makassar-branch-carried-out-flood-disaster-relief-aid-in-makassar/, accessed on December 27, 2023
[13] Rachman, A; Purwandana, A; Fitriya, N, ***Phytoplankton Community Structure of the Makassar Strait, Indonesia***, IOP Conference Series. Earth and Environmental Science; Bristol Vol. 789, Iss. 1, (Jun 2021). DOI:10.1088/1755-1315/789/1/012006

vegetation. The climate of Makassar is tropical with a distinct wet and dry season, and the rainfall varies considerably from year to year due to the El Niño Southern Oscillation[14]. The city is sensitive to a series of climate change hazards, including tidal floods, storm surges, and seawater intrusion in coastal aquifers. The coastal city of Makassar is also exposed to various climate change hazards, including floods, extreme weather, and extreme waves and abrasion. The city's vulnerability to climate change hazards, its low-lying topography, and the projected rise in sea levels have significant implications for the city's future, including potential infrastructure damage, increased diseases, and reduced access to clean water. The Makassar Strait ecosystem is an essential resource for the city's coastal livelihoods, and it is crucial to protect and preserve it for the city's sustainable development.

2. Urban Governance System

Indonesian cities such as Makassar are governed through a series of local government departments and agencies, supported by a five-year budget plan called the Rencana Pembangunan Jangka Menengah Daerah (RPJMD), or regional medium-term development plan. The RPJMD sets out a vision for the city by allocating funds to the different departments, which then have to be approved annually. Examples of key agencies are public works, responsible for infrastructure projects such as roads, bridges, and installing water systems; the municipal water company, or Perusahaan Daerah Air Minum (PDAM), responsible for managing water supplies; and Badan Perencanaan Pembangunan Daerah (BAPPEDA), the regional body for planning and development. Under the level of individual departments are the district and local level governments that provide services for residents and act as citizens' first contact with government officials. Despite the reliance on the local budget for projects and infrastructure improvements, large civil works projects that can create an impact at the city level require national government funds; these are called ministerial projects. Thus, there is often a discrepancy between what vision can be achieved based solely on the city's budget and what aspirations can be achieved while accessing additional funding from the national government and private investors[15].

3. Urban Economy

Makassar's economy has been experiencing steady growth, driven by various sectors. The city's role as a major trading hub and gateway to eastern Indonesia contributes to its economic development. The presence of shopping malls, markets, and trade services indicates the vibrancy of the commercial sector. Additionally, the growth of the manufacturing sector, as evidenced by the construction of hotels, shopping malls, and housing developments, suggests a diversification and expansion of economic activities. The tourism sector also plays a significant role in attracting visitors and generating income for the city. Despite these positive indicators, it is essential for Makassar to manage its resources and address challenges such as climate change and urbanization to ensure sustainable development. Some of the key economic sectors in Makassar include:

1. **Trade and services**. Makassar is a major trading hub for eastern Indonesia, with various shopping malls and markets catering to the needs of residents and visitors. The city is also a gateway to the rest of eastern Indonesia for maritime and aircraft traffic, contributing to its economic growth.

[14] CSIRO, ***Current and Future Climate of Makassar***, https://wp.csiro.au/r4da/files/2014/07/Current-and-future-climate-of-Makassar_English.pdf, accessed on December 27, 2023
[15] Op. cit, PreventionWeb

2. **Manufacturing**. Makassar has experienced a building boom, with several new four and five-star hotels, shopping malls, and housing developments opening up around the Tanjung Bunga area. This indicates that the manufacturing sector is growing, providing employment opportunities, and contributing to the city's economy.
3. **Tourism**. Makassar is home to several impressive Buddhist and Taoist temples, a new Chinese mosque, and beautiful beaches, attracting tourists from around the world. The tourism sector is a significant contributor to the city's economy, providing income and employment opportunities.
4. **Agriculture and fishing**. Despite the city's rapid growth, agriculture and fishing still play a crucial role in Makassar's economy. The city is located on the southwest coast of Sulawesi Island, providing easy access to fishing grounds and supporting the livelihoods of many residents.

Makassar's status as the busiest port and the most developed city in eastern Indonesia indicates a potential for increased disaster risks. The combination of rapid urbanization, industrial activities, and environmental pressure can contribute to heightened vulnerability. Climate change impacts, such as extreme weather events and rising sea levels, may exacerbate these risks. It is crucial for Makassar to proactively manage disaster potential by implementing robust disaster management and reduction initiatives. This includes developing early warning systems, improving infrastructure resilience, and promoting sustainable urban planning practices to minimize the impact of disasters.

As Makassar continues to grow and develop, sustainable resource management becomes paramount. The city needs to strike a balance between economic growth and environmental protection. This includes implementing measures to mitigate the negative environmental impacts of industrial and commercial activities. Sustainable agricultural practices and responsible fishing techniques should also be promoted to ensure the long-term viability of these sectors. Additionally, fostering collaboration between local government departments, agencies, and the private sector is crucial to effectively address the challenges of urbanization and climate change. By working together, stakeholders can develop innovative solutions and implement comprehensive strategies for sustainable development.

In conclusion, while Makassar's urban economy shows promising growth, it is important to address the potential challenges associated with increased development and disaster risks. By focusing on sustainable resource management, disaster preparedness, and collaboration among stakeholders, Makassar can foster resilient and sustainable development for the future.

4. Urban Trends

The following trends are occurring in Makassar as a result of rapid urbanization:

1. **Urban expansion**. Over the last ten years, the periphery region of Makassar and the border areas of Maros, Gowa, and Takalar municipalities have grown much faster than the population of the city center. This indicates that not only are the outer districts outpacing those of the center, but those of the center are decreasing in population. Migrants come to the city to seek jobs, and many of them end up settling on the periphery. Often, migrants in these areas go without many services, as public providers and local governments struggle to keep up with the water, sanitation, and electricity demand.

2. **Land reclamation and changing coastlines**. Makassar is currently undertaking an ambitious plan to create developable lots of land through land reclamation. The new coastline will present economic development opportunities and, for investors, the added incentive of flat, empty land. However, it is affecting natural ecosystems, local cultures, and economies.
3. **Water management and supply.** Water management and supply are essential considerations for any city. In the case of Makassar, the principal water sources for the municipal water company (PDAM) are the Jeneberang River and the Maros River (which later became the Tallo River). However, there are challenges associated with these water sources.

   The Jeneberang River faced a significant issue after a massive landslide occurred in 2007. As a result, the river water became highly turbid and required extensive filtration and treatment before it could be used. The muddy condition of the river water highlights the potential impact of natural disasters on water quality and availability in the area. It also emphasizes the need for robust filtration and treatment infrastructure to ensure the provision of clean and safe water to the residents.

   On the other hand, the Maros River is comparatively cleaner. However, the watershed that supplies water to the river has limited capacity. This limitation raises concerns about the availability of sufficient water resources, especially for the rapidly expanding northern and eastern regions of the city. The growing population and urban development in these areas could strain the existing water supply infrastructure and potentially lead to water scarcity if not addressed adequately.

   The analysis underscores the importance of addressing water management and supply challenges in Makassar. It highlights the need for effective filtration and treatment systems to handle the muddy water from the Jeneberang River. Additionally, it emphasizes the necessity of exploring alternative water sources or implementing measures to enhance the capacity of the Maros River watershed to meet the increasing demand for water in the expanding areas of the city.

   Sustainable water management practices, such as water conservation, efficient distribution systems, and integrated watershed management, should also be considered to ensure a reliable and sustainable water supply for the city's present and future needs. By addressing these challenges and implementing appropriate solutions, Makassar can improve its water management and supply systems, enhancing the quality of life for its residents and supporting the city's ongoing development.

B. Analysis of Community Vulnerabilities and Capacities

1. General Exposure, Sensitivity, and Adaptive Capacity

The notion of vulnerability, particularly about climate change, encompasses the extent to which a system is prone to or unable to handle adverse effects resulting from climate change, which include variations and extremes in climate conditions. It is crucial to acknowledge its three primary constituents: **Exposure**, **Sensitivity**, and **Adaptive Capacity**. Concerning poverty, vulnerability has been defined as the likelihood or risk that a household will encounter at least one occurrence of poverty in the near future[16]. This concept holds significance in

[16] Pritchett, Lant et al., **Quantifying Vulnerability to Poverty: A Proposed Measure, Applied to Indonesia**, Policy Research Working Paper No. 2437. © World Bank, Washington, DC. http://hdl.handle.net/10986/21355 License: CC BY 3.0 IGO

comprehending the potential obstacles and hazards faced by households and communities, and it can provide insights for targeted interventions and support measures. Moreover, vulnerability is also deliberated in relation to external indicators and crisis monitoring, specifically in Indonesia. In the Indonesian language, the term "vulnerable" is translated as "rentan," while "vulnerability" is translated as "kerentanan." These terms are employed to depict susceptibility, fragility, or the condition of being at risk[17].

The concepts of exposure, sensitivity, and adaptive capacity are discussed in various sources within the context of climate change and variability. Exposure is defined as the degree of climate stress felt by a specific unit of analysis, such as a neighborhood or sector. It can be characterized by long-term shifts in climate conditions or changes in climatic variability, including the frequency and intensity of extreme events. Sensitivity, on the other hand, refers to the impact of climate-related hazards on various systems and sectors of society. It examines the varying degrees to which these systems are susceptible to the impacts of climate change. Adaptive capacity, the third concept, pertains to the ability of a system to adjust to climate change. This includes adapting to climate variability and extremes by mitigating potential damages, capitalizing on opportunities, or effectively coping with the consequences[18].

Understanding the concepts of exposure, sensitivity, and adaptive capacity is crucial for comprehending the effects of climate change and variability on different systems and sectors, as well as for devising strategies to minimize potential damages and strengthen resilience. These concepts are particularly relevant in the context of climate risk assessment, stress testing, and measuring climate-related financial risks. They are also emphasized in relation to agricultural production, socioeconomic exposure, and climate change in specific regions. To assess the vulnerability of specific areas in Makassar, indicators representing each of these components can be utilized. Some of these indicators include:

1. **Global meteorological phenomena**. The assessment highlights the influence of global meteorological phenomena, such as "El Niño" and "La Niña," on climate patterns and marine biodiversity in Makassar.
2. **Climate hazards**. The city is most exposed to sea-level rise, floods, droughts, high winds, abrasion, and increased temperatures.
3. **Rainfall patterns**. The assessment notes that rainfall will be concentrated in a shorter rainy season, raising the risk of flooding in areas with poor drainage, particularly those in the eastern part of the city.
4. **Exposure rating by sub-district**: The assessment provides an exposure rating by sub-district, indicating the districts that are exposed to all four climate-related hazards: increased temperature, rainfall, droughts, and sea-level rise.

These indicators are used to quantify and map the exposure to climate change in specific areas of Makassar, providing valuable insights for vulnerability assessment and climate change adaptation planning. While, in detail, the indicators include:

[17] Ayi Supriyadi, **External Vulnerability Indicators: The Case of Indonesia**, Statistics Department, Bank Indonesia, Version of June 30, 2014, Paper Submitted for the Seventh IFC Biennial Conference on September 4–5, 2014.
[18] UNISDR, **What does Vulnerability mean?** www.unisdr.org/2004/campaign/booklet-eng/Pagina8ing.pdf, accessed on January 21, 2024

Table 3 Vulnerability of an area to climate-related risks categories

Exposure	Sensitivity	Adaptive Capacity
Whether or not an area is exposed to: ● Flooding ● Droughts ● Increase in temperature	Whether an area is or is not: ● Located near rivers that flood ● has a high level of poverty ● has a low level of educational attainment ● frequently floods	Whether an area possesses or not: ● high levels of public services such as water and electricity ● a presence of community organizations ● good levels of public spending

The factors that determine the vulnerability of an area to climate-related risks can be categorized into three dimensions: exposure, sensitivity, and adaptive capacity.

Exposure refers to whether an area is prone to specific climate-related events such as flooding, droughts, or an increase in temperature. For example, areas located near rivers that are prone to flooding are considered to have a higher exposure to flood risks.

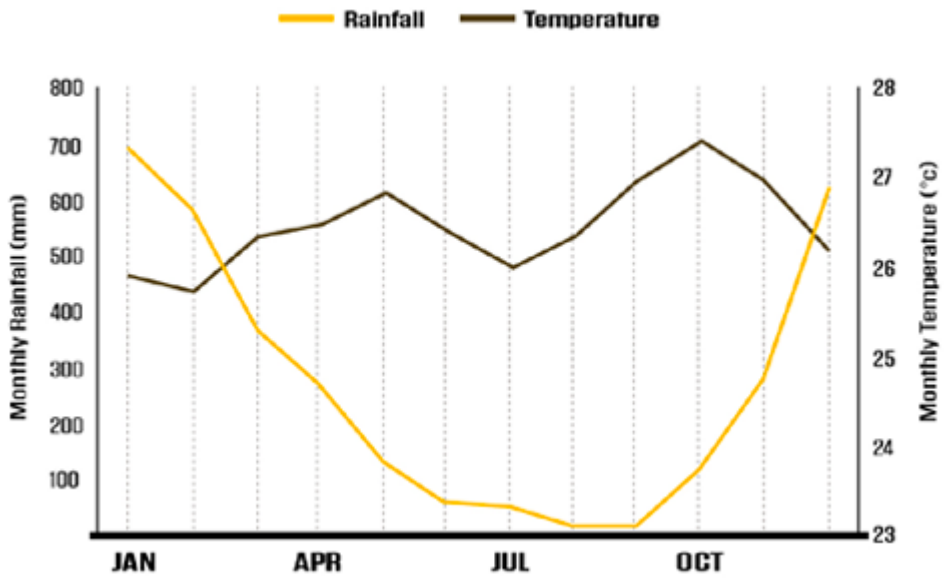
Sensitivity relates to the socio-economic characteristics of an area that may make it more vulnerable. Factors such as high levels of poverty or low levels of educational attainment can increase sensitivity to climate risks. Additionally, if an area frequently experiences floods, it indicates a higher level of sensitivity to flood events.

Adaptive capacity refers to the ability of an area to respond and adapt to climate-related risks. This includes factors such as the availability of public services like water and electricity, the presence of community organizations, and adequate levels of public spending. Areas with higher levels of these factors tend to have better adaptive capacity to mitigate and cope with climate risks.

By considering these factors, policymakers and stakeholders can assess the vulnerability of an area and develop appropriate strategies and interventions to enhance resilience and reduce the negative impacts of climate-related risks. This analysis underlines the importance of addressing exposure, sensitivity, and adaptive capacity while formulating effective climate change adaptation and mitigation plans.

2. Sub-District Climate Trends

Figure 2 Long-term mean of rainfall and temperature



Source: Maritime Meteorology Paotere Station

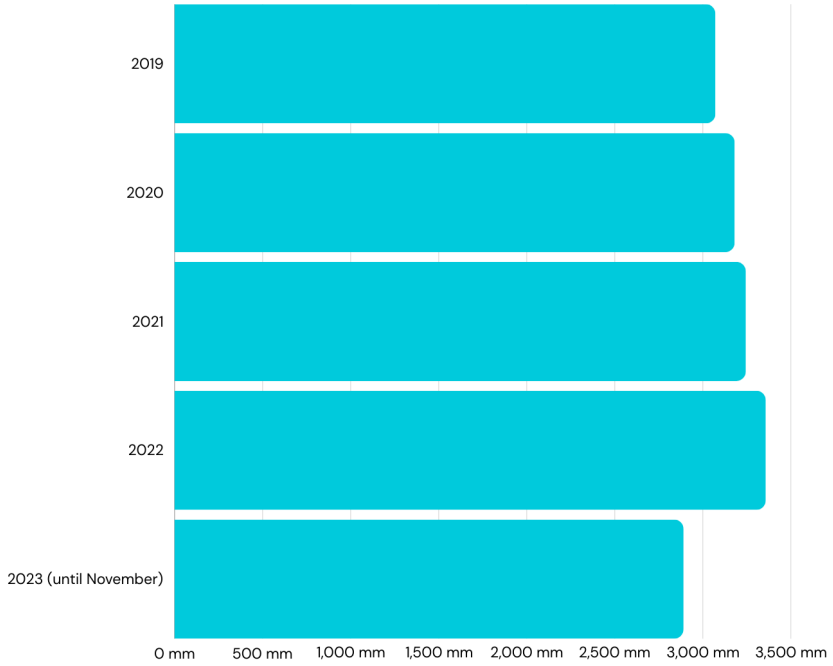
The long-term mean of rainfall in Makassar above refers to the average amount of rainfall recorded over an extended period of time in the city. It is typically calculated by analyzing historical rainfall data spanning several years or decades.

Analyzing the long-term mean of rainfall can provide insights into the climate patterns and precipitation trends in Makassar. It helps in understanding the typical or average amount of rainfall the city receives over the years and allows for comparisons between different periods.

By studying the long-term mean of rainfall, meteorologists, climatologists, and researchers can identify patterns, such as seasonal variations, trends, and anomalies in rainfall. This information is crucial for various sectors, including agriculture, water resource management, urban planning, and disaster preparedness.

Here is an analysis of the rainfall trend in Makassar over the past 5 years (2019-2023) based on data from the Maritime Meteorology Station Class I Makassar:

Figure 3 Rainfall Trends 2019-2023



There has been an increase in the total annual rainfall from 2019 to 2022, with the peak in 2022 (3,357.2 mm). The year 2023 shows a decrease in rainfall compared to the previous years, although it is still higher than in 2019.
Monthly Rainfall:

- The months with the highest rainfall generally occur in December, January, and February.
- The months with the lowest rainfall generally occur in July, August, and September.

Rainfall Patterns:

- Makassar has a monsoonal rainfall pattern, with two main seasons: the rainy season (October-April) and the dry season (May-September).
- The rainy season is typically influenced by west monsoon and northeast monsoon winds.
- The dry season is generally influenced by southeast monsoon winds.

Climate Change:

- It should be noted that rainfall trends can be influenced by climate change.
- Climate model predictions indicate that Indonesia, including Makassar, will experience increased rainfall in the future.
- Increased rainfall can lead to various impacts, such as floods, landslides, and waterlogging.

The rainfall trend in Makassar shows an increase over the past 5 years (2019-2022). The year 2023 shows a decrease in rainfall compared to the previous years, although it is still higher than in 2019. The potential impacts of climate change on future rainfall should be monitored and taken into account.

It is important to note that the long-term mean of rainfall is just one factor in understanding the climate of a specific location. Other variables, such as temperature, humidity, wind patterns, and geographical factors, also play significant roles in determining the overall climate characteristics of an area.

Based on the provided figure above, it can be inferred that the City of Makassar is likely to face several climate change hazards in the future. These hazards include heavy rainfall during a shortened rainy season, increased temperatures leading to prolonged dry seasons and possible droughts, sea-level rise, and high winds and waves.

The impact of these climate hazards will vary across different areas of the city due to its geographical characteristics. In terms of heavy rainfall and flooding, the area's most vulnerable are those located along the Jeneberang, Tallo, and Maros rivers. Peri-urban areas with inadequate drainage systems or lacking connectivity to existing networks are particularly exposed. Tamalanrea, Panakkukang, Rappocini, and Manggala are the sub-districts most affected.

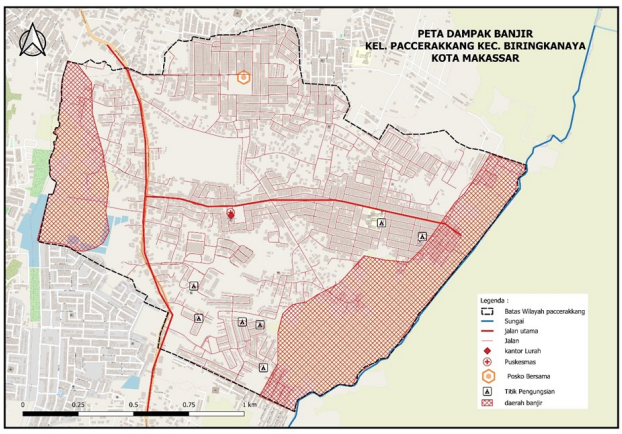
Increasing temperatures and droughts will primarily affect densely populated areas in the city center with poor wind circulation. Low-lying coastal areas and island communities, such as Tallo, Biringkanaya, Mariso, Tamalanrea, and Wajo, are highly vulnerable to sea-level rise. High winds and coastal erosion pose risks to districts in the south and west, including Barombong, Tamalate, Manggala, Panakkukang, Tallo, and Biringkanaya. These hazards can cause damage to houses, infrastructure, and property.

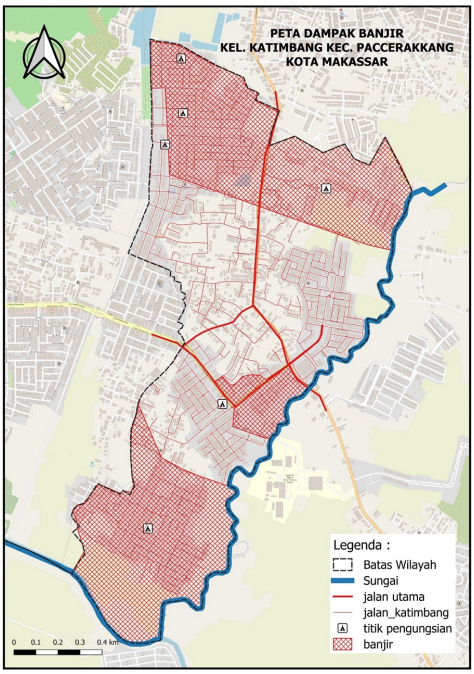
While certain areas of the city are more prone to these climate hazards, specific populations and urban systems are also at a higher risk. Urban poor communities residing along the coastline are particularly exposed to high winds, sea-level rise, and coastal erosion. The impacts on these communities will be further explored in subsequent sections. Additionally, urban systems such as drainage, water distribution, coastal defenses, roads, and critical infrastructure (such as the toll road and airport) are susceptible to these hazards. Businesses and industries operating in coastal areas or relying on exposed infrastructure are also at risk.

In summary, the climate change hazards in Makassar, as described above, have the potential to impact certain areas, populations, and urban systems more than others. Understanding these vulnerabilities is crucial for effective adaptation and resilience planning.

BIRINGKANAYA SUB-DISTRICT

Figure 4 Biringkanaya Map





The Biringkanaya sub-district in Makassar, South Sulawesi, Indonesia, has experienced repeated instances of flooding, resulting in substantial damage and displacement. This flooding has affected numerous villages and led to the temporary displacement of hundreds of families. The villages of Katimbang dan Paccerakkang, have been particularly impacted, with a significant number of houses and residents affected[19]. The Regional Disaster Mitigation Agency (BPBD) has reported a significant temporary displacement of people and families, causing a widespread impact on the local communities. Multiple evacuation sites have been activated to accommodate the affected residents, presenting significant challenges[20].

The flooding in Biringkanaya, Makassar, has been caused by intense and prolonged periods of heavy rainfall, coinciding with rising sea levels. The heavy rainfall, occurring over three consecutive days and ranging from moderate to heavy intensity, has resulted in extensive inundation and flooding in the area. Furthermore, the closure of waterways due to housing developments has been identified as a contributing factor to the severity of the flooding. The frequency of the flooding, occurring twice within a month, highlights the seriousness and recurrence of the issue in the area. As a consequence, numerous villages in the Biringkanaya sub-district have been submerged, leading to the temporary displacement of hundreds of families and significant damage to homes and infrastructure.

The inadequate coordination of the drainage system in the Tamalanrea, Biringkanaya, and Manggala sub-districts, which are interconnected, has worsened the flooding situation. This emphasizes the necessity for comprehensive measures to decrease the risks of disasters and improve resilience. It is crucial to address the root causes of flooding, including uncontrolled urbanization and the occupation of flood-prone areas by residential buildings. The frequent flooding in the Biringkanaya sub-district highlights the urgent need for comprehensive measures to mitigate the impact of future floods and protect the well-being of the local population[21].

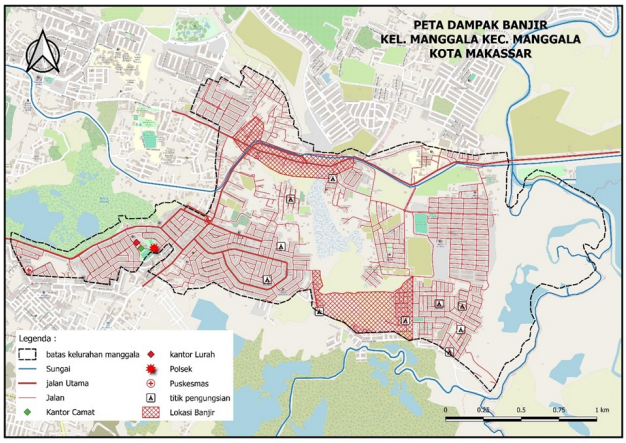
This analysis underscores the importance of integrated and coordinated approaches to address the root causes of flooding. It calls for measures such as improved drainage systems, controlled urbanization, and relocation of residential buildings from flood-prone areas. By implementing these comprehensive measures, the risks of flooding can be reduced, and the resilience of the affected sub-districts can be enhanced, ensuring the well-being and safety of the local population.

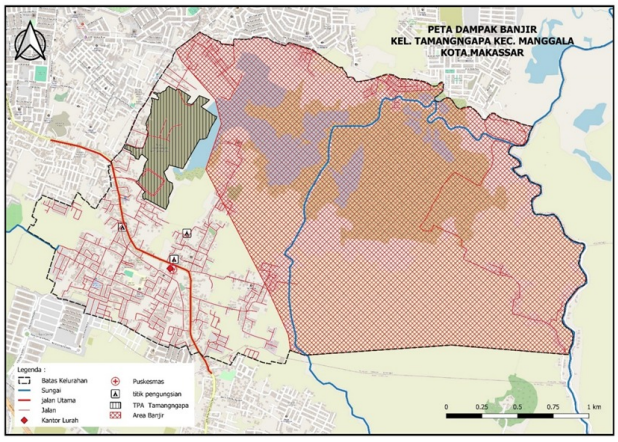
Efforts are being made to tackle the root causes of the flooding, including uncontrolled urbanization and the occupation of flood-prone areas by residential buildings. The long-term consequences of the flooding in Biringkanaya are yet to be fully assessed, but it is anticipated that the affected communities will experience significant material, environmental, and economic impacts.

[19] Ihsan et al, **Towards a water-sensitive city: level of regional damage to floods in Makassar City (case study: Manggala District)**, 2020 IOP Conf. Ser.: Earth Environ. Sci. 473 012085
[20] Antaranews, **Flood in Makassar affected 3,344 houses: BPBD**, https://en.antaranews.com/news/267765/flood-in-makassar-affected-3344-houses-bpbd, accessed on January 20, 2024
[21] Thoban et al., **Urban resilience to floods in parts of Makassar, Indonesia**, The 1st Geosciences and Environmental Sciences Symposium (ICST 2020), Virtual Conference, Yogyakarta, Indonesia

MANGGALA SUB-DISTRICT

Figure 5 Manggala Map





Recurrent flooding has also caused significant damage and displacement in Manggala, a sub-district of Makassar City, South Sulawesi, Indonesia. The flooding has impacted numerous villages and caused the displacement of hundreds of families. The affected areas include Manggala, and Tamangapa, with a substantial number of houses and residents being affected. The Regional Disaster Mitigation Agency (BPBD) reported that the flooding has resulted in the displacement of a significant number of people and families, with a large-scale impact on the local communities. The flooding has led to the activation of multiple evacuation locations and has posed significant challenges for the affected residents, the similarity to the situation in Biringkanaya suggests that both areas have experienced similar flooding events, emphasizing the recurrent nature of the problem. This highlights the importance of implementing long-term strategies for disaster mitigation, preparedness, and resilience-building to mitigate the impact of future flooding incidents.

SUB-DISTRICT CONCLUSION

In general, the situation in Biringkanaya and Manggala sub-districts related to the long-term effects of the flood can be summarized as follows:

The flooding has resulted in significant material loss for the affected communities, including damage to houses, infrastructure, and other assets[22]. This loss not only affects individuals' properties but also impacts the overall recovery and rebuilding process.

Table 4 Significant loss by floods

Scope	Reference	Analysis
Local News Reports	Kompas: Banjir Makassar: BPBD Catat 567 Rumah Terendam, Kerugian Ditaksir Capai Rp 16 Miliar (https://reliefweb.int/report/indonesia/indonesia-flooding-makassar-city-south-sulawesi-province-13-feb-2023) Detik: Banjir Makassar Meluas, Ratusan Rumah Terendam dan Taksi Air Beroperasi (https://news.detik.com/video/230213080/kota-makassar-terendam-banjir-ketinggian-air-mencapai-1-meter) CNN Indonesia: Banjir Makassar Meluas, Ratusan Rumah Terendam dan 12.000 Warga Mengungsi (https://bnpb.go.id/berita/banjir-melanda-kota-makassar-sebanyak-1869-jiwa-mengungsi)	These reports mention initial estimates of material losses ranging from Rp 16 million to several billion Rupiah.
Government Reports	National Disaster Management Agency (BNPB) - Laporan Bencana 2023: (https://www.gva.vc/) Makassar City Disaster Management Agency (BPBD Makassar) - Laporan Bencana Banjir 2023: (Currently unavailable online, you may need to contact BPBD Makassar directly for access)	These reports will provide more comprehensive data on material losses, including: ● Number of damaged houses and other structures ● Estimated cost of infrastructure damage ● Economic losses to businesses and individuals
Academic Research	"Assessing the economic impact of floods in urban areas: A case study of Makassar, Indonesia" by Asriati et al. (2020) (https://www.sciencedirect.com/science/article/abs/pii/S1342937X13002694) "Impact of floods on livelihoods and vulnerability in Makassar, Indonesia" by Nurdin et al. (2022) (https://www.sciencedirect.com/topics/earth-and-planetary-sciences/flood)	These studies offer insights into the broader economic and social impacts of material losses due to flooding, which can be valuable for understanding the long-term recovery process.

[22] Chandra Lal Pandey, **Transboundary flood resilience: Insights from Narayani and Mahakali Basins**, February 2023 International Journal of Disaster Risk Reduction, 86(4):103535, DOI:10.1016/j.ijdrr.2023.103535

1. **Disruption of community activities**. The disruption of community activities is another significant consequence of the flood. Daily routines, work-related tasks, and educational activities have been affected, leading to a temporary halt in normal community functioning[23].
2. **Environmental degradation**. Environmental degradation is a concerning outcome of the flood. The increased land pollution and the demand for servicing facilities and infrastructure contribute to the deterioration of the overall environmental quality. This highlights the importance of sustainable development practices and environmental conservation[24].

Table 5 Environmental degradation

Theme	Degradation	Source
Increased Land Pollution	● Flooding often transports and deposits various pollutants like plastic waste, sewage, and industrial effluent onto land. This contaminates soil and water resources, impacting agricultural productivity and ecosystem health. ● In Biringkanaya and Manggala, poor waste management practices already contribute to significant land pollution. The floods likely worsened this situation, raising concerns about long-term consequences.	● Makassar City Government - Environmental Management Agency (DLH Kota Makassar): https://www.instagram.com/dlh.makassar/?hl=en (Indonesian) ● Indonesia National Disaster Management Agency (BNPB): [https://bnpb.go.id/] (Indonesian) ● UN Environment Programme (UNEP): [https://www.unep.org/] ● World Bank - Indonesia Environment and Natural Resources ● "Environmental Degradation in Urban Areas: A Case Study of Makassar, Indonesia" by Asriati et al. (2020) (https://www.sciencedirect.com/science/article/abs/pii/S1342937X13002694: https://www.sciencedirect.com/science/article/abs/pii/S1342937X13002694)
Demand for Servicing Facilities and Infrastructure	● Post-flood recovery often leads to increased construction and infrastructure development. While necessary, this can put further strain on the environment if not managed sustainably. ● In densely populated areas like Biringkanaya and Manggala, concerns exist about deforestation for new housing projects, increased strain on sewage systems, and potential for further land degradation.	
Importance of Sustainable Development	● Addressing environmental degradation requires a long-term approach that integrates development needs with environmental protection. Sustainable development practices in Biringkanaya and Manggala could include: ○ Improved waste management systems to minimize land pollution. ○ Green infrastructure solutions like rain gardens and bioswales to manage stormwater and reduce flooding risks. ○ Promoting climate-resilient construction practices to minimize environmental impact	

[23] op.cit
[24] IOP Conference Series: Earth and Environmental Science, **Towards a water-sensitive city: level of regional damage to floods in Makassar City (case study: Manggala District)**, Ihsan et al 2020 IOP Conf. Ser.: Earth Environ. Sci. 473 012085

	of post-flood reconstruction.	
Environmental Conservation	● Protecting existing natural areas like mangroves and wetlands is crucial for maintaining ecological balance and mitigating future flood risks. Conservation efforts in Biringkanaya and Manggala could focus on: ○ Reforestation programs to restore degraded lands and improve water absorption. ○ Mangrove rehabilitation initiatives to buffer coastal areas from storm surges and floods. ○ Raising awareness among communities about the importance of environmental conservation for long-term sustainability.	

3. **Increased vulnerability**. The recurrent flooding in Manggala and Biringkanaya has increased the vulnerability of the local communities to future flood events, highlighting the need for comprehensive disaster risk reduction and resilience-building measures[25].

Table 6 Vulnerabilities sector

Sector	Detail
Physical Vulnerability	● Damaged Infrastructure: Flooded houses, damaged roads and bridges, and compromised sanitation systems limit access to essential services and increase the risk of further damage during future floods. ● Loss of Livelihoods: Flooded agricultural land, destroyed businesses, and disrupted transportation networks can significantly impact income generation and economic stability, increasing reliance on external aid. ● Health Risks: Stagnant floodwaters become breeding grounds for mosquitoes and other disease vectors, increasing the risk of waterborne illnesses, skin infections, and respiratory problems.
Social Vulnerability	● Displacement and Disruption: Families displaced by floods often face cramped living conditions in temporary shelters, leading to psychosocial stress, community fragmentation, and increased risk of domestic violence. ● Loss of Social Capital: Damage to community centers, schools, and religious institutions disrupts social networks and support systems, hindering collective action and recovery efforts. ● Marginalized Groups: Women, children, elderly individuals, and people with disabilities often face greater challenges accessing resources and assistance during and after floods, exacerbating existing inequalities.
Economic Vulnerability	● Loss of Assets and Savings: Floods destroy homes, belongings, and productive assets, pushing families deeper into poverty and hindering their ability to recover financially. ● Increased Debt Burden: Families may resort to high-interest loans to rebuild, leading to long-term debt and economic insecurity.

[25] op.cit

	• Disruption of Markets and Businesses: Flooded businesses face lost inventory, damaged equipment, and disrupted supply chains, impacting local economies and job opportunities.
Environmental Vulnerability	• Land Degradation: Floods erode soil, contaminate water sources, and damage ecosystems, reducing agricultural productivity and impacting food security. • Deforestation and Loss of Natural Buffers: Mangrove deforestation weakens coastal defenses, increasing vulnerability to storm surges and tidal flooding. • Increased Pollution: Floodwaters carry pollutants like sewage and industrial waste, further contaminating water resources and harming public health.

4. Economic impacts. The flood's economic impacts are also noteworthy. Reduced income and hindered economic development negatively affect the affected communities, creating additional challenges for recovery and socio-economic stability[26].

The flooding in Manggala and Biringkanaya sub-districts has been attributed to heavy rainfall and extreme weather conditions. The city's vulnerability to flooding underscores the urgent need for comprehensive disaster risk reduction and resilience-building measures to mitigate the impact of future flooding events and safeguard the well-being of the local population. The city government of Makassar has been implementing policies and initiatives aimed at reducing vulnerability and enhancing climate resilience, including the development of early warning systems, the construction of flood control infrastructure, and the promotion of community-based disaster risk reduction measures.

3. Respondents and Situation Analysis

Table 7 Distribution of respondents based on gender

Urban Village	Female	Male	Total (%)
Tamangapa	44	18	62 (12,8%)
Manggala	84	41	125 (25,8%)
Katimbang	122	52	174 (35,9%)
Pacerakkang	81	43	124 (25,6%)
Total respondents	331	154	485 (100%)

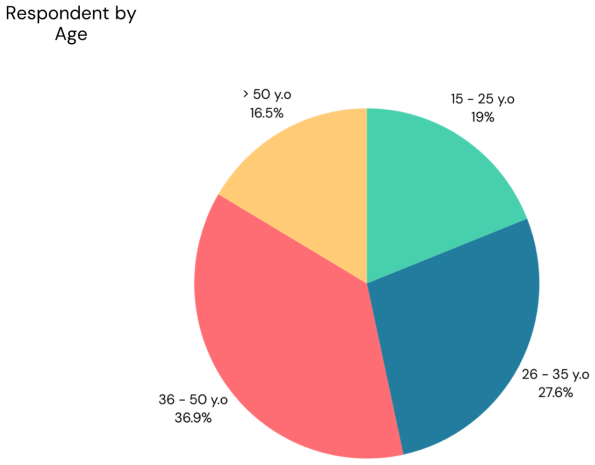
The composition of respondents distributed in 4 urban villages based on their population reveals that 68% of the total respondents are female, while 32% are male. This indicates a higher representation of female respondents

[26] E3S Web of Conferences 200, 01007 (2020), Urban resilience to floods in parts of Makassar, Indonesia

in the study. Nearly 43% of the respondents are housewives, 16% are traders, and 16% are students, while the rest have various professions.

Approximately 43% of the respondents are housewives, suggesting that a significant portion of the surveyed population consists of women who primarily manage household responsibilities. Additionally, 16% of the respondents are traders, indicating a notable presence of individuals engaged in commercial activities. Similarly, 16% of the respondents are students, suggesting the inclusion of the student population in the study.

Figure 6 Distribution of respondents based on their age categories



The figure above reveals that the majority of the respondents fall into the productive age range, which is an important demographic group for economic and social activities.

The data shows that the age group of 36-50 years has the highest representation among the respondents, comprising 36.9% of the total. This indicates that individuals in their late thirties to mid-fifties are well represented in the study.

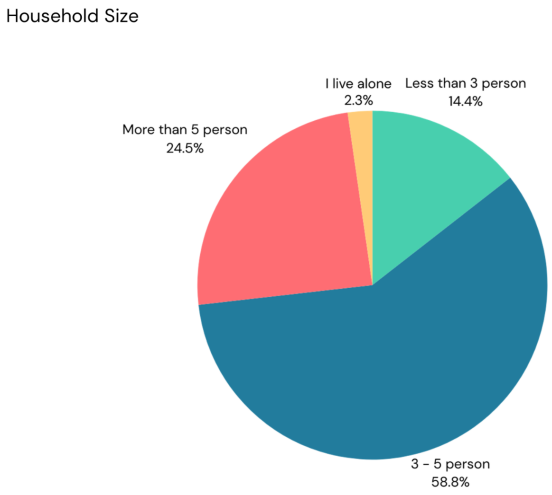
The second-largest age group is 26-35 years, accounting for 27.6% of the respondents. This suggests the inclusion of individuals in their late twenties to mid-thirties, who are typically in the early stages of their careers and active in various domains.

The age group of 15-25 years constitutes 19% of the respondents, indicating the participation of young individuals, including teenagers and young adults. This age group often represents students, early professionals, or individuals in the process of transitioning to adulthood.

Lastly, the respondents above 50 years old make up 16.5% of the sample. This suggests the involvement of individuals who are likely experienced professionals or retirees.

Overall, this information provides insights into the age distribution of the respondents, highlighting the representation of different age groups within the study.

Figure 7 Distribution of respondents based on household size categories



The figure above provides information about the distribution of respondents based on the number of family members.

The data shows that the majority of respondents, accounting for 58.8%, have a family size between 3-5 people. This suggests that a significant portion of the surveyed population belongs to households with a moderate number of family members.

Additionally, 24.5% of the respondents report having more than 5 people in their family. This indicates the presence of relatively larger households with extended family members or multiple generations living together.

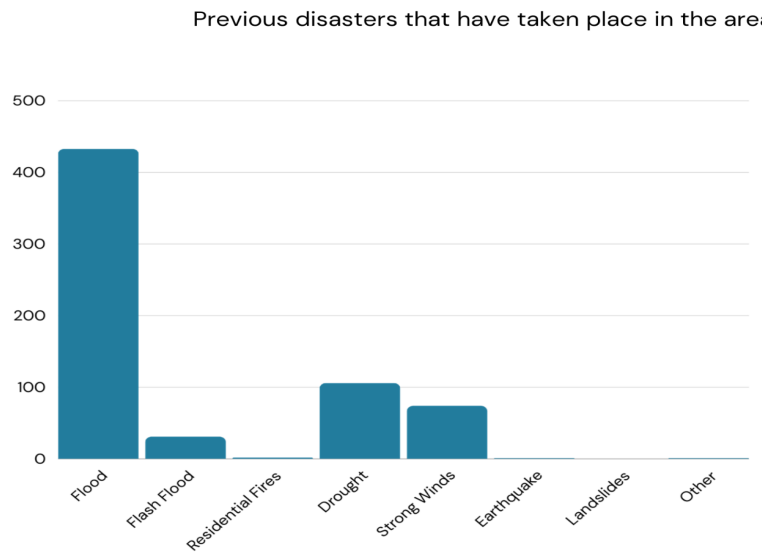
On the other hand, 14.4% of the respondents have a family size of less than 3 people. This may include small nuclear families or individuals living with only one or two family members.

Lastly, a small percentage of respondents, 2.3%, indicate living alone. This implies that a fraction of the surveyed population is single or living independently without any family members.

Overall, this information provides insights into the composition of family sizes among the respondents, ranging from moderate-sized families to larger households and individuals living alone.

4. Awareness and Understanding of the Issue

Figure 8 Respondents' living conditions in disaster-prone areas and the types of disasters they frequently encounter



According to the data, a significant majority of the respondents, representing 92%, reside in areas that are prone to disasters. This suggests that the surveyed population faces a higher risk of experiencing various types of disasters due to their geographical location.

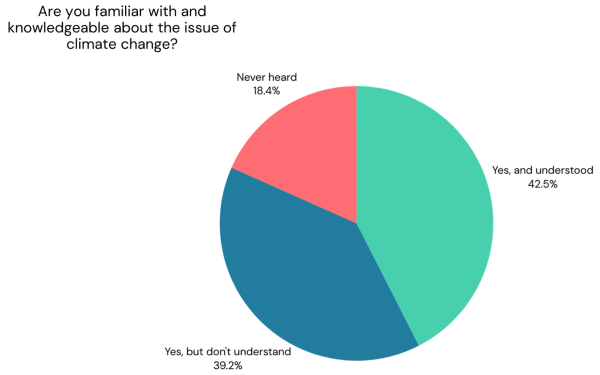
Among the reported disasters, floods are the most commonly experienced, with 97% of the respondents indicating their occurrence. This indicates that floods are a prevalent and significant hazard in the surveyed area.

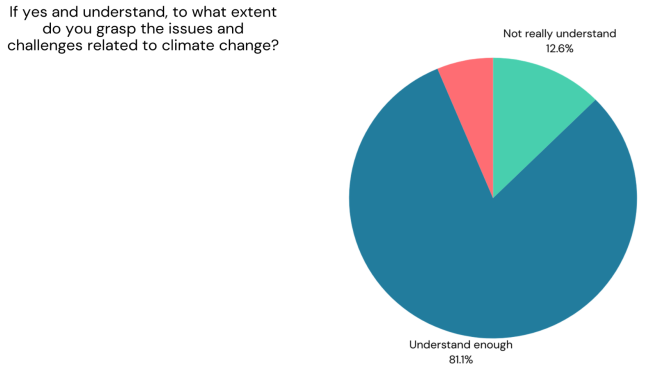
Furthermore, 24% of the respondents mentioned experiencing droughts. Droughts can have severe consequences on water availability, agriculture, and overall livelihoods in affected areas.

Additionally, 17% of the respondents reported facing strong winds. Strong winds can result in property damage and infrastructure destruction and also pose risks to personal safety.

Overall, this information highlights the vulnerability of the surveyed population residing in disaster-prone areas. The high percentage of respondents experiencing floods indicates the need for effective measures to mitigate flood risks, while the occurrences of droughts and strong winds emphasize the importance of preparedness and resilience strategies in the face of these specific hazards.

Figure 9 Respondents' awareness and understanding of the issue of climate change





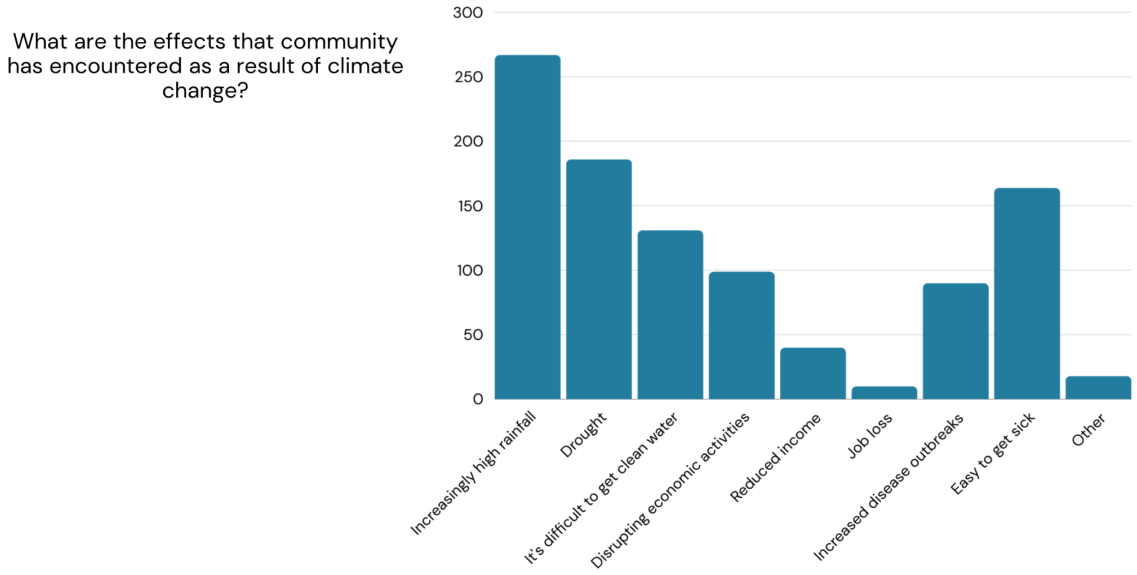
According to the data, 42.5% of the respondents indicated that they have heard and comprehended information regarding climate change. This suggests that a significant portion of the surveyed population has been exposed to discussions and knowledge about climate change, indicating a level of awareness among the respondents.

Furthermore, among those who have heard about climate change, 81% claimed to have a sufficient understanding of the issue. This indicates that a majority of the respondents who are aware of climate change feel confident in their comprehension and knowledge of the subject matter.

The results suggest that efforts to raise awareness about climate change have been partially successful among the surveyed population. However, it is important to note that the sample size of 206 respondents may not represent the entire population, and the findings may not be generalized to the broader community.

To gain a more comprehensive understanding of public awareness and understanding of climate change, a larger sample size and more detailed questions about specific aspects of climate change would be necessary. Nonetheless, the data indicates a positive trend in terms of awareness and comprehension of the issue among the surveyed respondents.

Figure 10 The impacts of climate change as perceived and experienced by the respondents



According to the information provided (FGDs), the respondents' understanding of climate change impacts includes two main aspects. Firstly, they observe an increase in rainfall intensity in their region. This suggests that heavy rainfall events have become more frequent or severe, potentially leading to issues such as flooding and waterlogging.

Secondly, the respondents note that the weather becomes extremely hot during the summer. This indicates a perception of rising temperatures, which can have various consequences for individuals and their health. The mention of participants experiencing headaches after heat exposure suggests potential health impacts related to heat stress.

The survey results further support the notion that climate change has had tangible effects on the surveyed population. A significant majority of the respondents, 89.5%, reported experiencing the impacts of climate change. The most commonly mentioned impacts include flooding, hot weather, extreme weather changes, difficulties in accessing clean water, and deteriorating air quality.

These findings illustrate the real-life implications of climate change on the surveyed community. The mentioned impacts align with known consequences of climate change, such as increased flood risks, heat waves, and challenges related to water and air quality.

Understanding the specific impacts experienced by communities is crucial for developing appropriate adaptation and mitigation strategies. This information can inform policymakers, urban planners, and relevant stakeholders about addressing the identified issues and implementing measures to enhance resilience to climate change.

5. The Role of Women in the Context of Gender and Social Cohesion

The data collection highlights the role of women in the context of gender and social cohesion in the four neighborhoods. It emphasizes several significant points:

- Women play a substantial role in the policy-making process at the community level. The presence of women as community leaders (RT leaders) ranging from 10% to 30% in the four neighborhoods indicates their active involvement and influence in decision-making processes.
- Women are actively engaged in emergency flood response efforts. At the household level, they take responsibility for safeguarding valuable items and preparing for evacuation. At the community level, women contribute to the setup of evacuation centers and communal kitchens, indicating their active participation in providing support and resources during flood emergencies.
- Women are identified as key communicators within the family unit regarding the development of the flood situation. This is attributed to the fact that women, particularly housewives, tend to be present at home throughout the day. Their constant presence allows them to update and disseminate information to other family members, ensuring that everyone is aware of the evolving situation and can take appropriate actions.

Overall, this analysis highlights the important roles women play in various aspects related to gender and social cohesion in the four neighborhoods. Their involvement in policy-making, emergency response, and communication underscores the significance of recognizing and empowering women in addressing and managing flood-related challenges.

Additionally, in the four neighborhoods, based on the information gathered through focus group discussions (FGDs), there are people with disabilities (4 participants with physical impairments) who actively participate in community activities and part of the community units such as PKK and Karang Taruna. Similarly, the youth, who are part of the Karang Taruna organization, are involved in the community emergency response teams formed at the neighborhood level. Moreover, physically healthy older adults also frequently engage in community activities. The information highlights the active involvement of different demographic groups within the four neighborhoods.

Firstly, people with disabilities are actively participating in community activities. This indicates inclusivity and the recognition of their contributions to community life. Their engagement showcases the importance of creating an inclusive environment that enables their active participation and involvement in various initiatives.

Secondly, the youth, specifically those involved in the Karang Taruna organization, play a role in the community emergency response teams established at the neighborhood level. This demonstrates their commitment to community service and their willingness to actively contribute to the well-being and safety of the neighborhood. The involvement of young people in emergency response teams can help foster a sense of responsibility, preparedness, and resilience within the community.

Lastly, physically healthy older adults are also actively engaged in community activities. Their participation showcases their continued involvement and contributions to the community despite their age. This highlights the importance of recognizing and harnessing the knowledge, skills, and experiences of older adults for the betterment of the community.

Overall, the analysis underlines the active participation of people with disabilities, youth, and older adults in community activities within the four neighborhoods. Their involvement contributes to the social cohesion, resilience, and well-being of the community as a whole. It also emphasizes the significance of fostering an

inclusive environment that values the contributions of different demographic groups and provides opportunities for their active engagement in community initiatives.

C. Assessment of Existing Coping Mechanisms and Adaptation Strategies

1. Access to Information

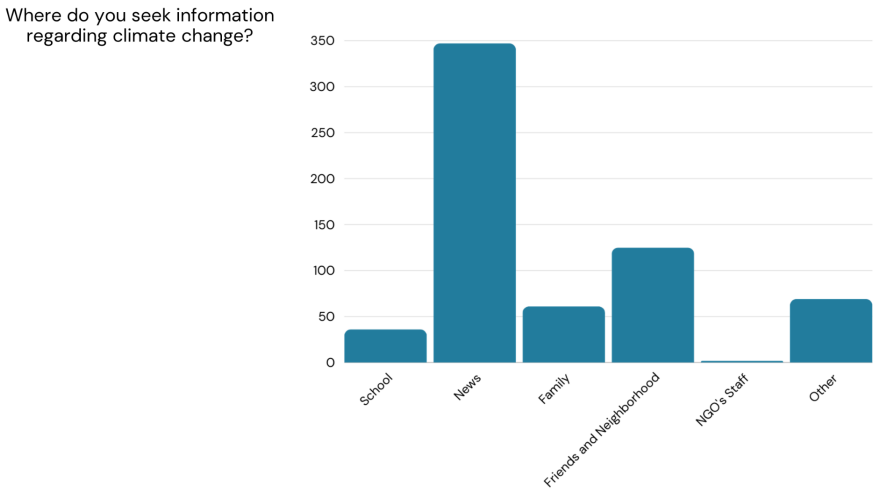
According to the survey data, a significant portion of the respondents, approximately 43%, acknowledged that they comprehend the connection between climate change and the increased frequency or severity of climate-related disasters. This suggests a level of awareness among the surveyed population regarding the potential consequences of climate change.

Furthermore, the respondents identified various sources from which they obtained information on this topic. The most prominent source mentioned is mass media, including television, radio, and newspapers, which 79% of the respondents relied upon. This indicates the important role that mainstream media plays in disseminating information and creating awareness about climate change and its impacts.

Additionally, a considerable number of respondents, 28.5%, mentioned obtaining information from friends or neighbors. This highlights the influence of interpersonal communication and social networks in spreading knowledge and understanding of climate change.

The mention of other sources, such as family, school, and other media, indicates that respondents receive information from multiple channels, suggesting a diverse range of information dissemination methods within their communities.

Figure 11 The sources of information the respondent relies on



Overall, the findings indicate that a significant proportion of the respondents have a grasp of the link between climate change and climate-related disasters. The reliance on mass media as a primary source of information

underscores the importance of effective communication and media engagement in raising awareness and understanding of climate change issues.

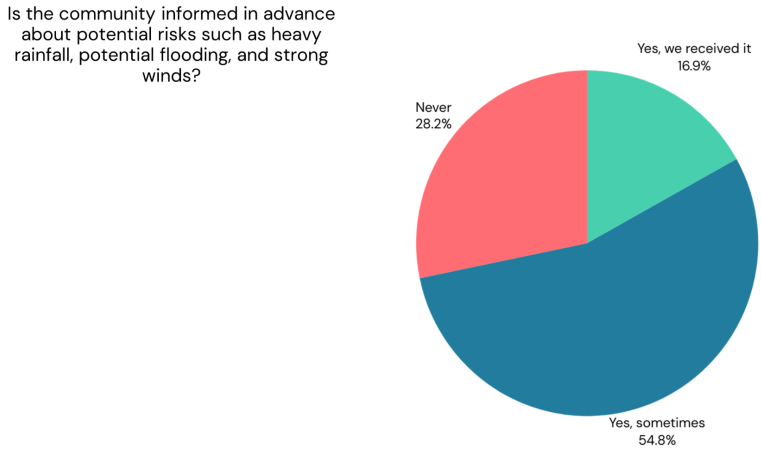
It is worth noting that the study sample consists of 210 respondents, and the findings may not be representative of the entire population. However, the data suggests a positive trend in terms of knowledge and information dissemination regarding climate change and its associated impacts.

According to the survey findings, a relatively low percentage of respondents, only 17%, reported receiving early warning information for hydro-meteorological hazards. This suggests that a majority of the respondents are not adequately informed about potential risks associated with rainfall intensity, flooding, and strong winds. The lack of access to early warning information can hinder preparedness and response efforts, potentially leading to increased vulnerability to these hazards.

Furthermore, the data indicates that the frequency of receiving such information is inconsistent for a significant proportion of the respondents. Approximately 55% of the survey's respondents reported receiving the information irregularly, implying that they only receive it on occasion. This irregularity in information dissemination can hinder the ability of individuals and communities to adequately prepare for and respond to hydro-meteorological hazards.

Moreover, 28% of the respondents stated that they do not receive early warning information for these hazards at all. This highlights a significant gap in the dissemination of crucial information, potentially leaving a considerable portion of the population unaware and unprepared for potential risks.

Figure 12 Access to early warning information



The findings underscore the importance of improving the dissemination and accessibility of early warning information for hydro-meteorological hazards. Enhancing communication channels, including the use of technology, community-based systems, and partnerships with relevant stakeholders, can contribute to more effective and widespread dissemination of such information.

It is essential to address the reasons behind the limited access to early warning information, such as infrastructure limitations, communication gaps, and awareness gaps, to ensure that communities are better prepared and equipped to respond to hydro-meteorological hazards.

Among the respondents who indicated that they received early warning information, various channels were mentioned. The most commonly mentioned channel is oral communication, with 46% of the respondents obtaining information through this method. This suggests that direct communication, such as through community leaders, local authorities, or word-of-mouth, plays a significant role in disseminating early warning information.

Social media is another prominent channel, with 40.5% of the respondents mentioning it as a source of early warning information. This highlights the increasing influence of social media platforms in providing real-time updates and alerts regarding hydro-meteorological hazards. The wide reach and accessibility of social media platforms make them effective tools for information dissemination, particularly among younger demographics.

Additionally, 31% of the respondents mentioned receiving early warning information through WhatsApp. WhatsApp is a popular messaging platform known for its group chat function, making it a convenient channel for sharing information within communities or social circles.

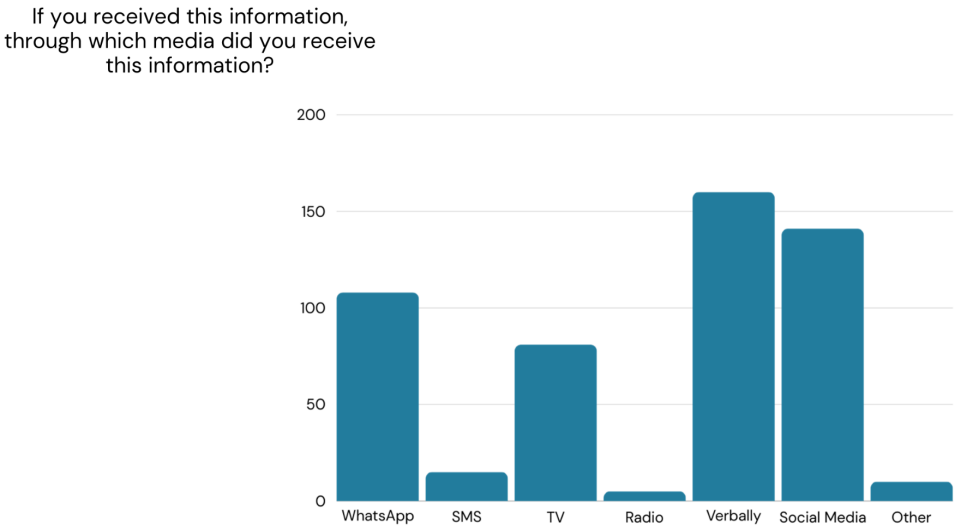
Television was mentioned by 23% of the respondents as a source of early warning information. Traditional media outlets, such as television, continue to play a role in disseminating important alerts and warnings to a wide audience.

The diversity of channels mentioned indicates that respondents rely on multiple sources to obtain early warning information. This multiplicity of sources may reflect different preferences, access to technology, and information-seeking behavior among the respondents.

To ensure effective dissemination of early warning information, it is important to leverage a combination of communication channels, considering the specific characteristics and needs of the target audience. This may involve a mix of oral communication, social media platforms, messaging applications, and traditional media outlets.

Efforts should be made to strengthen community-based early warning systems, improve the accessibility of information, and enhance communication networks to ensure that early warning messages reach a larger portion of the population and contribute to effective preparedness and response to hydro-meteorological hazards.

Figure 13 The different channels through which respondents receive early warning information, regardless of its regularity



2. Preparedness Initiative at Household and Community Level

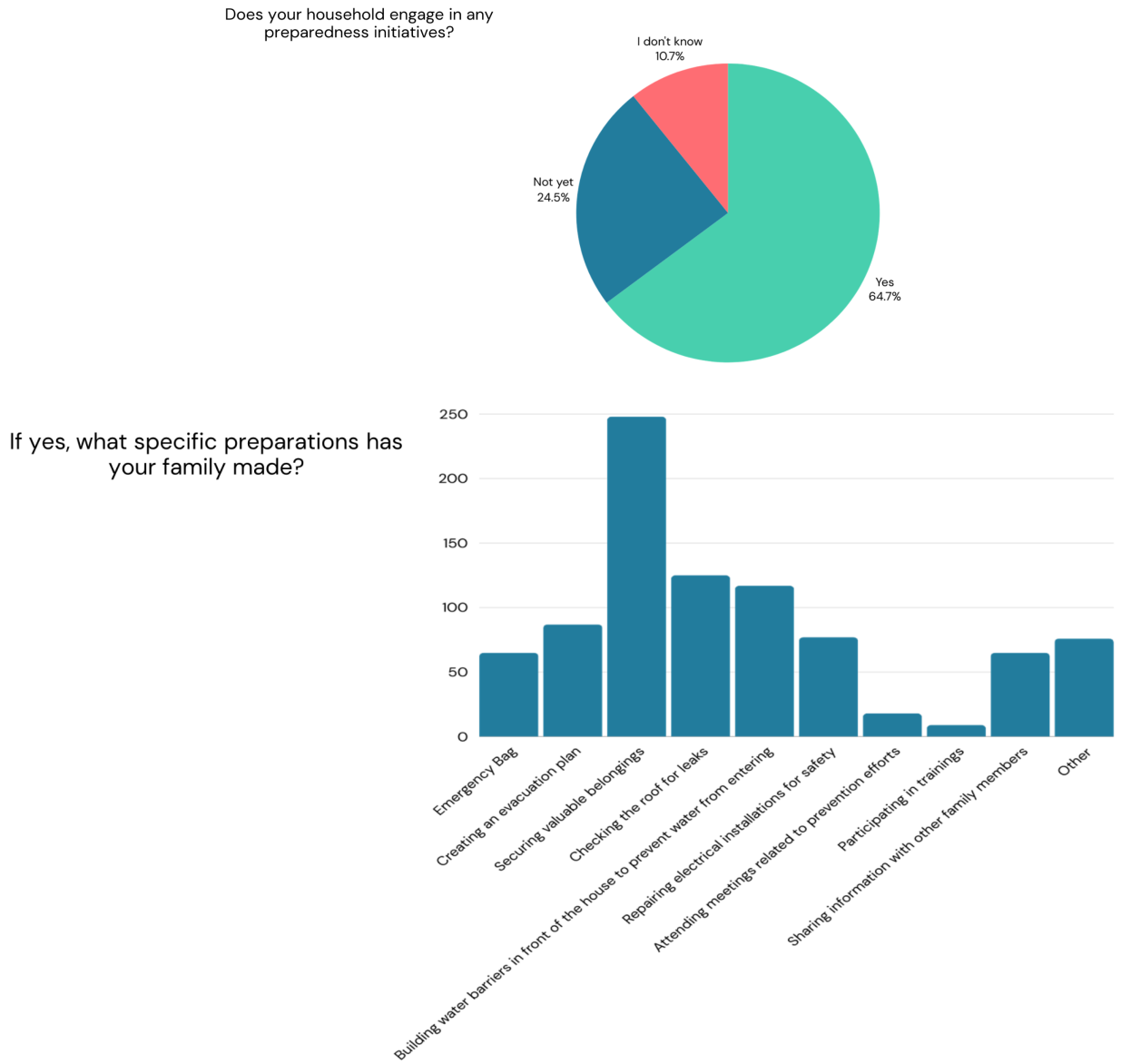
According to the survey results, a significant majority of households, nearly 65%, reported implementing preparedness measures. This indicates a positive trend towards recognizing the importance of preparedness and taking proactive steps to mitigate potential risks.

The mentioned household preparedness efforts encompass various actions. Some of the common measures taken include securing valuable items in a safe location to protect them during emergencies, conducting roof inspections to ensure they are watertight during the rainy season, constructing water barriers to prevent flooding, developing evacuation plans, securing electrical installations to minimize hazards, preparing emergency bags with essential supplies, and sharing information and raising awareness within the family about potential disasters.

These efforts reflect a comprehensive approach to household preparedness, addressing different aspects such as physical protection, infrastructure maintenance, evacuation planning, and communication strategies.

It is worth noting that approximately 24.5% of households indicated that they have not yet implemented preparedness efforts. This suggests a need for further awareness-raising and support to encourage a higher level of preparedness among these households.

Figure 14 The level of preparedness efforts undertaken by households

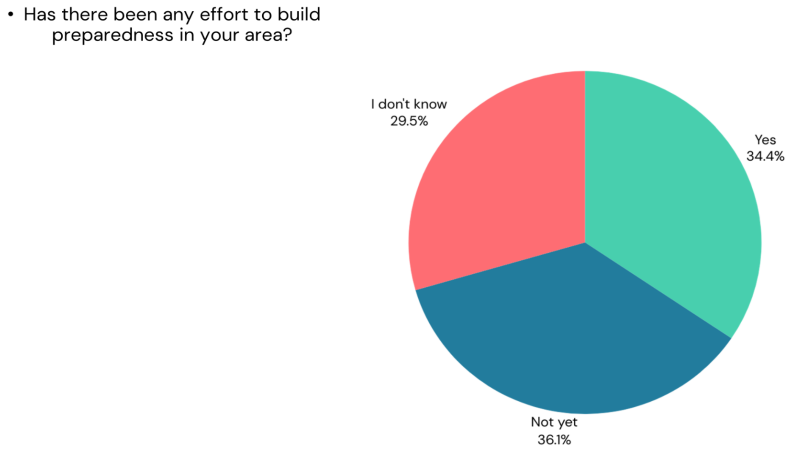


Promoting household-level preparedness is essential for building resilience and reducing vulnerabilities to disasters. By implementing these measures, households can better protect themselves, their belongings, and their overall well-being during and after hazardous events.

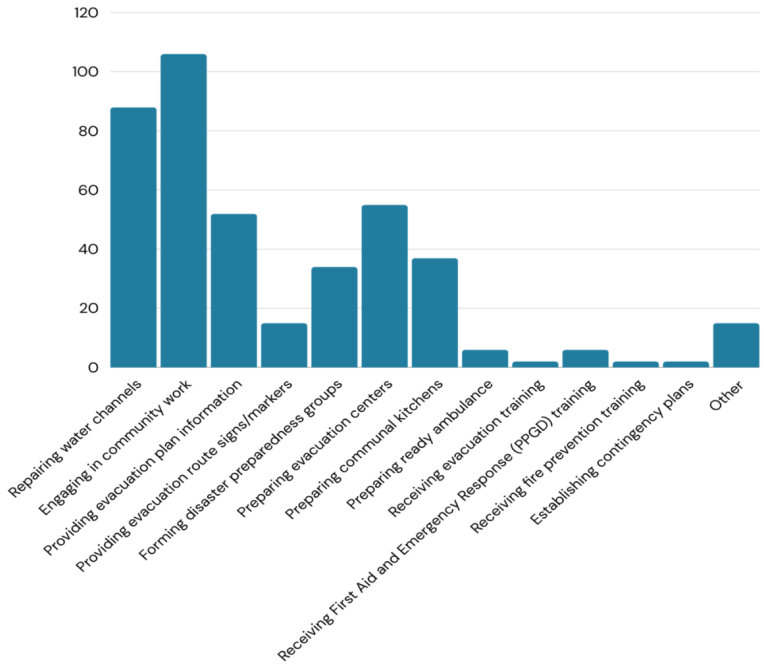
Efforts should be made to continue educating households about the importance of preparedness and providing guidance on specific actions they can take to enhance their resilience. This can include disseminating information through various channels, conducting training programs, and fostering community engagement to encourage collective preparedness and response efforts.

According to the survey results, a notable percentage of respondents, 34%, reported the existence of collective efforts within their community to address flood situations. This indicates a positive sign of community engagement and a recognition of the importance of working together to mitigate the impacts of floods.

Figure 15 The community-level preparedness efforts and highlights specific actions taken by communities to address flood situations



If yes, what efforts have been made?



The mentioned community-level preparedness efforts encompass a range of activities. These include conducting community clean-up activities to keep the environment free from debris and potential obstructions, repairing water channels to ensure proper drainage and flow, establishing designated evacuation sites where community members can seek shelter during floods, sharing information about evacuation plans to ensure everyone is aware of the procedures and routes, setting up communal kitchens to provide food and sustenance during emergencies, and forming emergency response teams at the neighborhood level to facilitate coordination and response efforts.

These initiatives reflect the proactive approach of communities in preparing for flood situations based on their past experiences. The efforts are often led by local neighborhood associations, such as the RT (Rukun Tetangga) and RW (Rukun Warga), which play a crucial role in organizing and mobilizing collective actions within the community.

It is worth noting that a significant portion of respondents, 36%, stated that there are no collective efforts in their community to address flood situations. This highlights a potential gap in community preparedness and the need for increased awareness and collaboration among community members.

The preparedness efforts undertaken at the community level, including the initiatives mentioned above, contribute to building resilience and enhancing the community's capacity to respond effectively to flood situations. The establishment of evacuation sites, the presence of evacuation route signs, and the formation of emergency response teams demonstrate a systematic approach to preparedness.

The preparation of rubber boats in some areas further indicates a proactive response to potential flooding emergencies, emphasizing the importance of having appropriate resources to support evacuation and rescue operations.

To foster community-level preparedness, it is crucial to promote community participation, strengthen local associations, and provide support and resources to further develop collective actions. Collaborative efforts between communities, local authorities, and relevant stakeholders can lead to more effective flood preparedness, response, and recovery strategies.

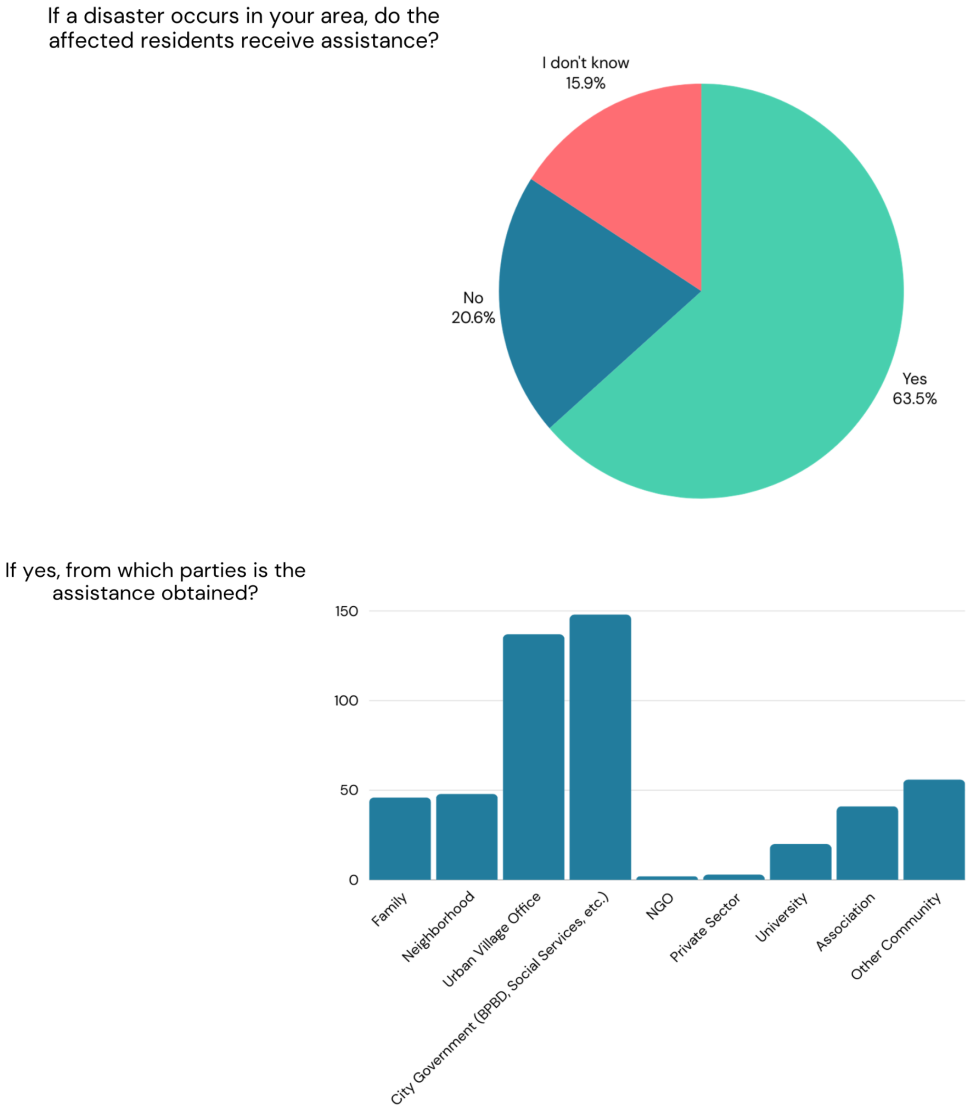
In flood-prone areas, it is common for individuals to take the initiative to evacuate to predetermined evacuation locations when floods occur. These locations typically include mosques/mushalas, schools, neighborhood association posts, or neighboring houses that are considered safe from floods. This practice demonstrates the community's resilience and self-help approach in managing flood situations. However, it is acknowledged that some residents may choose to stay in their homes due to concerns about the security of their belongings. This highlights the complex decision-making process individuals face during emergencies, balancing personal safety with the protection of their property.

3. Support Mechanism and Access to Assistance

Regarding assistance during flood emergencies, the survey results indicate that approximately 48.5% of respondents reported receiving some form of support. This suggests the presence of aid programs or relief efforts targeting flood-affected residents. The assistance is often provided by government agencies such as the Regional

Disaster Management Agency (BPBD) and the Department of Social Affairs (Dinas Sosial). Additionally, local governments play a role in distributing aid to affected communities. Moreover, assistance is also received directly from various sources, including communities, family members, or other organizations. This indicates the importance of collective efforts and support from multiple stakeholders in addressing the needs of flood-affected residents.

Figure 16 The community's response and support mechanisms during flood situations



However, it is worth noting that 29% of respondents stated that they did not receive any assistance, and 22.5% answered that they did not know about the availability of assistance. These highlights potential gaps in the distribution or awareness of aid programs, indicating the need for improved coordination, communication, and accessibility of support services during flood emergencies. Efforts should be made to ensure that affected residents receive timely and sufficient assistance to meet their immediate needs.

Community engagement, effective coordination between government agencies and local organizations, and the involvement of various stakeholders are crucial in enhancing the overall response and support mechanisms during flood emergencies. By strengthening these aspects, communities can improve their resilience and capacity to cope with and recover from flood events.

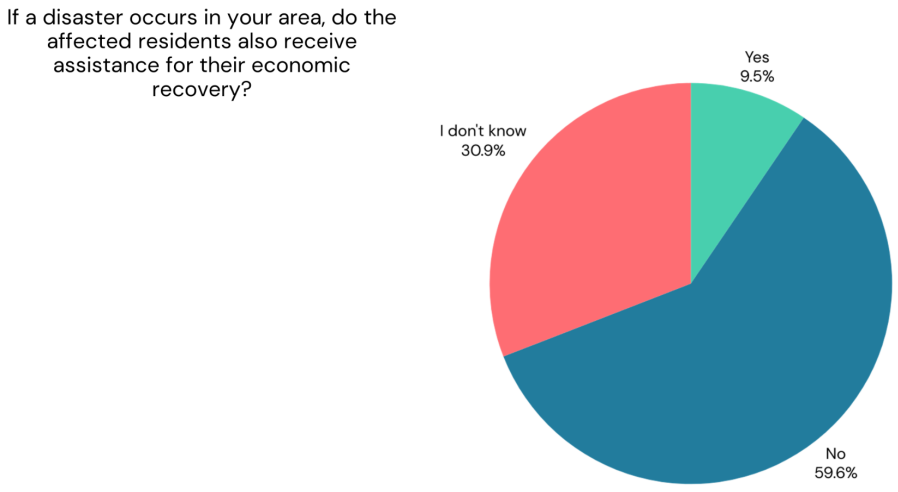
The information provided suggests that the distribution of assistance is primarily focused on evacuation centers, where residents seeking refuge during floods are expected to receive aid. This approach may result in residents who opt to stay in their homes during floods not receiving the same level of support. The limited personnel and resources available for aid distribution play a role in this decision-making process.

The duration of time that affected residents stay in evacuation centers varies depending on the severity of the flood impact. In previous incidents, residents typically stayed in evacuation centers for a shorter period, ranging from 3 to 5 days. However, in the flood event of the previous year, the prolonged stay in evacuation centers lasted between 7 to 10 days. This extended period in evacuation centers can have significant implications for the livelihoods of residents, particularly those who rely on daily economic activities such as trading.

4. Access to Economic Recovery Assistance

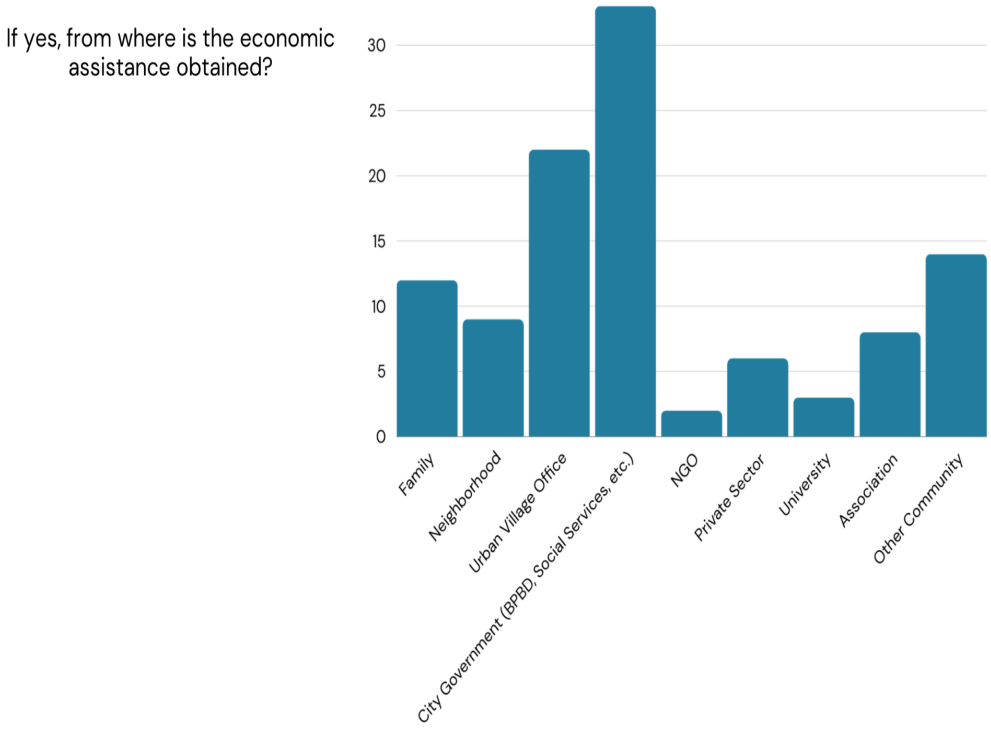
In terms of economic recovery assistance, the survey results indicate that a significant proportion of respondents, nearly 60%, stated that they did not receive any aid for their economic recovery. This suggests a gap in support for affected residents in rebuilding their livelihoods after the floods. Only a small percentage, 9.5% of respondents, reported receiving economic recovery assistance. It is worth noting that a substantial portion of respondents (almost 31%) indicated that they were unaware of the availability of economic recovery assistance. This highlights the importance of improving communication and awareness regarding available support services during the recovery phase.

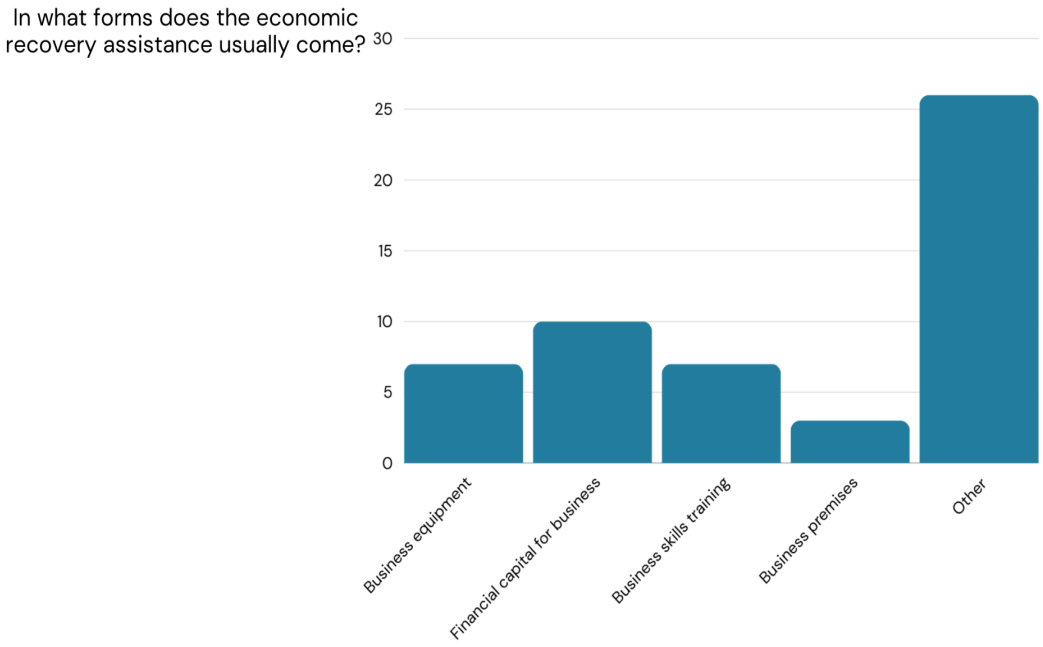
Figure 17 The distribution of economic recovery assistance



Efforts should be made to ensure that assistance reaches all affected residents, regardless of whether they choose to evacuate or stay in their homes during floods. This may involve exploring alternative distribution mechanisms or expanding the reach of aid programs to include households that do not seek refuge in evacuation centers. Moreover, providing comprehensive support for economic recovery is crucial to help affected residents restore their livelihoods and regain financial stability in the aftermath of floods.

Figure 18 The sources and forms of economic recovery assistance received by respondents





According to the survey results, 9.5% of respondents (46 individuals) reported receiving economic recovery assistance. These respondents mentioned various sources of assistance, including the Local Government, neighborhood authorities, other communities, family members, and other parties such as companies, universities, and NGOs. This indicates that support for economic recovery came from a diverse range of organizations and institutions.

The forms of assistance received were also diverse, covering different aspects of economic recovery. Examples mentioned include financial aid for business capital, equipment, training, and business premises. This suggests that the assistance provided was tailored to meet the specific needs of recipients in restarting or rebuilding their economic activities.

Interestingly, nearly 58% of respondents stated that they received assistance in other forms. However, during the FGD, none of the participants were able to provide further details or explanations about these other forms of assistance. It is important to note that the FGD participants were not recipients of the economic recovery assistance, which may explain their lack of knowledge regarding the specific forms of assistance received by some respondents. The discrepancy between the survey responses and the FGD highlights the need for further clarification and understanding of the assistance provided in different forms.

Overall, the findings suggest that economic recovery assistance was available to a relatively small percentage of respondents, and it was obtained from various sources. The diverse forms of assistance indicate efforts to address the specific needs of individuals and businesses affected by the floods. However, there may be a need for better documentation and communication regarding the nature and availability of economic recovery assistance to ensure transparency and understanding among all stakeholders.

5. Monitoring and Evaluation Mechanism

During the FGD process, information was obtained from the neighborhood officials that there is currently no mechanism in place to actively monitor the activities related to the assistance provided by various parties, both in the emergency response phase and the recovery phase.

The statement above highlights a significant gap in the monitoring process for the assistance provided during both the emergency response phase and the recovery phase. The lack of a monitoring mechanism raises concerns about the accountability and effectiveness of the aid distribution process.

Monitoring is crucial to ensure that the assistance reaches the intended recipients and is used appropriately. It helps identify any gaps or inefficiencies in the distribution system and allows for timely adjustments and improvements. Without an active monitoring mechanism, it becomes challenging to track the utilization of the aid and evaluate its impact on the affected individuals and communities.

To address this issue, it is important to establish a robust monitoring system that can track the distribution and utilization of assistance throughout the different phases of disaster response and recovery. This system should involve clear guidelines, regular reporting mechanisms, and accountability measures to ensure transparency and effectiveness.

By implementing an active monitoring mechanism, the authorities can have better visibility into the aid activities, identify any issues or bottlenecks, and take appropriate actions to improve the overall assistance process. It also helps in building trust among the beneficiaries and the community, as they can be assured that the assistance is reaching those in need and is being utilized effectively for their recovery.

Overall, the absence of a monitoring mechanism for the assistance activities highlights a crucial area for improvement in disaster response and recovery efforts. Establishing an effective monitoring system will contribute to more transparent, accountable, and impactful assistance delivery to the affected individuals and communities.

V. Identification of Gaps and Needs in Disaster Risk Management Framework

This section will explain the gap and needs based on the project's logical framework (Logframe). Furthermore, the logical framework helps identify the needs necessary to address these gaps. These needs can be categorized into various areas, such as financial resources, technical expertise, training, policy support, stakeholder engagement, or community participation. Identifying these needs is essential for developing effective strategies and interventions to bridge the gap and achieve the desired project outcomes.

By analyzing the gap and needs based on the project's logical framework, project managers and stakeholders can gain a comprehensive understanding of the challenges and requirements for successful project implementation. This analysis serves as a basis for decision-making, resource allocation, and prioritization of activities to ensure that the project's objectives are met and desired outcomes are achieved.

A. Output 1.1: Community members are involved in assessing climate and disaster vulnerability and current strategies

1. The Involvement of Community Members in Assessing Climate and Disaster Vulnerability and Evaluating Current Strategies

The Output 1.1, which focuses on the involvement of community members in assessing climate and disaster vulnerability as well as evaluating current strategies. However, it states that community members have not been engaged in conducting studies related to climate or climate change. On the other hand, CWS-INANTA recently conducted a Community-Based Vulnerability and Capacity Assessment (CVCA) to assess vulnerability. However, no discussions have taken place yet regarding strategies based on the findings of the vulnerability assessment.

The analysis suggests that there is a lack of community participation and involvement in the initial stages of climate and disaster vulnerability assessments. This suggests a potential gap in incorporating the perspectives and knowledge of community members who are directly affected by climate-related hazards and disasters. However, it is positive to note that a CVCA has been conducted, which signifies a step towards understanding the community's vulnerability and capacity.

To ensure the effectiveness and relevance of strategies, it is crucial to involve community members in the assessment process and subsequent discussions. Their firsthand experiences and insights can provide valuable information for developing strategies that address the specific needs and concerns of the community. By actively engaging community members, there is an opportunity to foster a sense of ownership and empower them in shaping the strategies for climate adaptation and disaster risk reduction.

Moving forward, it is essential to incorporate community perspectives and knowledge into the formulation of strategies based on the vulnerability assessment. This can be achieved through participatory processes, such as community consultations, workshops, and collaborative decision-making platforms. By actively involving community members, the strategies developed can be more context-specific, effective, and sustainable in addressing climate and disaster vulnerabilities.

2. The Factors That Motivate or Hinder Community Members' Participation in Assessments Related to Climate Change

It states that there is currently no dedicated program focusing on climate change in the target village. As a result, community members rely on social media or television for information about climate change. Despite this, community members are interested in further understanding climate change because it directly affects their community, particularly in terms of the risks posed by floods and droughts.

The analysis highlights the importance of having targeted programs and initiatives at the community level to raise awareness and understanding of climate change. Without specific programs, community members may lack access to accurate and comprehensive information about climate change and its local implications. Relying on social media and television as primary sources of information may limit their understanding or expose them to potentially unreliable or incomplete information.

The interest shown by community members in gaining a deeper understanding of climate change is a positive sign. It indicates their recognition of the direct threats posed by floods and droughts in their community. This interest can serve as a motivation for engaging community members in assessments and decision-making processes related to climate change adaptation and mitigation strategies. By providing targeted programs, workshops, and educational materials, community members can be empowered to actively participate in assessing their vulnerabilities, identifying appropriate strategies, and implementing actions to address climate change impacts.

To enhance community members' participation, it is important to establish channels for reliable and localized information dissemination. This can include engaging local stakeholders, organizing community workshops and dialogues, and utilizing community leaders as trusted sources of information. By fostering a sense of ownership and empowering community members with knowledge, their participation in assessments and subsequent actions can be significantly enhanced.

3. The Key Areas of Knowledge and Understanding That Community Members Possess Regarding Climate and Disaster Vulnerability

It states that community members have an understanding of unpredictable weather patterns, particularly the occurrence of prolonged heat waves in 2023, which resulted in drought and water scarcity for plants. Additionally, they are aware that the community experiences floods and waterlogging during the rainy season. However, their understanding of the correlation between floods, droughts, and climate change is limited.

The analysis reveals that community members have some awareness of the immediate impacts of climate variability, such as heatwaves, droughts, floods, and waterlogging. This suggests an experiential understanding of the local climate patterns and their effects on the community's livelihoods and natural resources. However, there is a need to deepen their knowledge about the underlying causes and long-term implications, particularly in relation to climate change. Enhancing their understanding of the connections between these events and climate change can help community members make informed decisions and take appropriate actions to address climate and disaster vulnerabilities.

The information also highlights the importance of addressing socioeconomic disparities within the community. It mentions that there are families living in poverty and lacking education, indicating that some community members may face additional challenges in understanding and responding to climate and disaster risks. To effectively engage the community, it is crucial to consider their diverse economic backgrounds and educational levels. Tailored educational programs, accessible information materials, and capacity-building initiatives can help bridge knowledge gaps and empower all community members, including those with lower socioeconomic status.

In summary, community members have knowledge and understanding of certain climate and disaster-related phenomena based on their experiences. However, there is a need to strengthen their understanding of the underlying causes, such as climate change, and to provide information and resources that cater to the diverse socioeconomic backgrounds within the community. By addressing these areas, community members can be better equipped to assess and respond to climate and disaster vulnerabilities in their local context.

4. How Community Members Perceive Their Role in Promoting Resilience and Taking Action Against Climate and Disaster Risks

It states that community members from the four locations are aware of the significance of their role and are willing to act as information channels, disseminating knowledge and raising awareness among other community members. They express a sense of satisfaction and willingness to contribute to the cause. However, they also recognize that their individual efforts are not enough to bring about the desired impact.

The analysis highlights the understanding among community members that collective action and collaboration are essential to effectively address climate and disaster risks. They acknowledge the importance of support from various stakeholders, including the government, INANTA (presumably an organization involved in the program), and other community groups. This recognition indicates a desire for partnerships and coordinated efforts to promote resilience within their communities.

By emphasizing the need for external support, community members highlight the importance of capacity-building initiatives, resources, and guidance from relevant organizations and authorities. Their perception of the collective nature of the task demonstrates a willingness to work together and a recognition that a comprehensive approach involving multiple stakeholders is necessary to achieve meaningful results.

To effectively engage community members in promoting the program, it is crucial to establish strong partnerships with the government, INANTA, and other community groups. This can involve providing training, resources, and ongoing support to empower community members to take action. Additionally, fostering an environment of collaboration, where community members are actively involved in decision-making processes, can enhance their sense of ownership and commitment to promoting resilience within their communities.

Overall, the perception of community members regarding their role in promoting resilience and taking action against climate and disaster risks reflects a readiness to contribute and a recognition of the need for collective efforts and external support. By leveraging this willingness and facilitating partnerships, the program can effectively engage community members and harness their potential to create positive change in building resilience and mitigating climate and disaster risks.

B. Output 1.2: Community-led disaster preparedness is established

1. The Level of Establishment of Community-Led Disaster Preparedness in the Current Context

It states that the community is familiar with working through neighborhood (RT) and community unit (RW) programs. This suggests that there are existing structures and systems in place for community engagement and cooperation. The community members express confidence that if the disaster preparedness program is integrated into the RT/RW activities, it can be carried out collectively.

Additionally, the information highlights the formation of a special group for Early Warning Systems (EWS) or anticipatory actions. This group is built in collaboration with the government and relevant agencies, such as the Regional Disaster Management Agency (BPBD) or the Social Affairs Office (Dinas Sosial).

This partnership indicates a joint effort to support and strengthen community-led disaster preparedness. By involving the government and relevant agencies, the community can benefit from their expertise, resources, and guidance.

The analysis suggests that community-led disaster preparedness is relatively well-established in the current context. The community's familiarity with the neighborhood and community unit programs provides a foundation for collective action and collaboration. By incorporating disaster preparedness activities into these existing programs, the community can leverage their established structures and processes to enhance their resilience and response capabilities.

The formation of a dedicated group for Early Warning Systems (EWS) or anticipatory actions further demonstrates the community's proactive approach to disaster preparedness. This group's collaboration with the government and relevant agencies indicates a coordinated effort to improve early warning mechanisms and preparedness measures. The periodic achievement targets set throughout the program suggest a commitment to monitoring and evaluating progress.

To further strengthen community-led disaster preparedness, ongoing collaboration and coordination between the community, government, and relevant agencies are crucial. This can involve regular communication, joint planning, training sessions, and the allocation of necessary resources. The efforts of the government and agencies in supporting the community-led initiatives can contribute to building a more resilient and prepared community.

In summary, the existing neighborhood and community unit programs, as well as the formation of a specialized group for Early Warning Systems (EWS) or anticipatory actions, indicate a well-established foundation for community-led disaster preparedness. By integrating disaster preparedness activities into existing programs and fostering collaboration with the government and relevant agencies, the community's capacity to anticipate and respond to disasters can be enhanced.

Efforts of preparedness and readiness are an important part of the anticipatory/early action approach, as they help build the capacity of communities and institutions to respond to disasters. However, anticipatory/early action goes beyond just preparedness and readiness efforts by emphasizing the importance of taking proactive measures based on early warning information.

The concept of anticipatory/early action has been proposed by humanitarian organizations such as the International Federation of Red Cross and Red Crescent Societies (IFRC), the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), and the World Food Programme (WFP). These organizations recognize the importance of taking action before a disaster occurs based on early warning information to reduce impacts and save lives. Currently, anticipatory/early action has become a core component of disaster risk management efforts and is included in many disaster management policies and strategies worldwide.

Early warning and impact-based early warning are related concepts in disaster risk management, and both are closely linked to the concept of anticipatory/early action. Early warning refers to the timely and effective provision of information about impending disasters. This information can include alerts, forecasts, and warnings about natural hazards such as floods, storms, droughts, and earthquakes. Early warning systems use various tools and technologies, such as satellite imagery, weather stations, and community-based monitoring, to detect and monitor natural hazards and provide early warning information.

2. The Initiatives and Plans Implemented by the Community to Enhance Disaster Preparedness

It mentions that most of the existing preparedness efforts are centered around flood mitigation programs initiated by the government. These programs involve activities like waste management, community clean-up drives, and maintenance of drainage systems. It is worth noting that these initiatives are collaborative efforts between the government and the community, indicating a shared responsibility in addressing flood-related risks.

However, at the community level, there is currently no collective preparedness program in place. This suggests a gap in community-led initiatives specifically dedicated to disaster preparedness. While the government-led programs involve community participation, there is a need for community-driven efforts that focus on preparedness measures beyond flood mitigation.

On an individual level, many families have taken proactive measures to enhance their personal preparedness for disasters, particularly in the context of floods. Examples include raising the height of their houses to mitigate flood damage and preparing boats or floatation devices to navigate the floodwaters during the rainy season. These individual actions demonstrate a sense of self-reliance and resilience within the community members.

To further enhance community-led disaster preparedness, there is a need to develop collective initiatives that go beyond flood mitigation and encompass a broader range of hazards. These initiatives could include community-based early warning systems, disaster education and training, establishment of emergency response teams, and coordination mechanisms for disaster response and recovery. By fostering a collective approach, the community can strengthen its overall resilience and preparedness for various types of disasters.

Collaboration between the government and the community remains crucial in advancing community-led disaster preparedness. The government can provide support in terms of resources, technical expertise, and guidance, while the community can contribute local knowledge, participation, and active engagement in the planning and implementation of preparedness initiatives.

In summary, the existing initiatives and plans implemented by the community primarily revolve around government-led flood mitigation programs, with active community involvement. However, there is a need for

community-led collective preparedness efforts that address a wider range of hazards. Individual actions, such as house elevation and preparation of boats or floatation devices, demonstrate a level of personal preparedness. To strengthen disaster preparedness, it is important to develop community-driven initiatives and foster collaboration between the government and the community.

3. The Strengths and Weaknesses of Community-Led Disaster Preparedness Efforts

It highlights that the community's strengths lie in their knowledge and familiarity with their own environment. Having lived in their respective areas for an extended period, they have gained a deep understanding of the local conditions and are capable of adapting to the challenges posed by disasters. This familiarity and adaptability can be valuable assets in disaster preparedness and response.

On the other hand, the weaknesses of community-led disaster preparedness efforts are identified. One weakness is the uneven understanding of preparedness issues within the community. This suggests that there may be variations in knowledge and awareness of the importance of disaster preparedness among community members. Addressing this gap in understanding and ensuring consistent awareness across the community can be a challenge that needs to be overcome.

Another weakness mentioned is the sometimes-lacking directed coordination. This implies that there may be a lack of clear and effective coordination mechanisms among community members and relevant stakeholders involved in disaster preparedness activities. Without proper coordination, efforts may be disjointed, leading to inefficiencies and reduced effectiveness in preparedness measures.

To address these weaknesses, the information emphasizes the need for institutional support at the community level. This institutional support can take the form of community-based organizations or local institutions that provide guidance, resources, and expertise to facilitate community-led disaster preparedness initiatives. By establishing clear targets and objectives, these institutions can help ensure that the activities are driven by the community and are aligned with specific goals.

In summary, the strengths of community-led disaster preparedness efforts lie in the community's knowledge of their environment and their adaptability. However, weaknesses include uneven understanding of preparedness issues among community members and the need for improved coordination. To overcome these weaknesses, institutional support at the community level is necessary to guide and facilitate community-led initiatives, ensuring that they are community-driven and have clear targets. By addressing these strengths and weaknesses, community-led disaster preparedness efforts can be strengthened and made more effective in enhancing community resilience.

4. The Key Challenges That the Community Faces When It Comes to Effectively Implementing Disaster Preparedness Plans

It is mentioned that the community typically relies on government programs for financial support in implementing their preparedness plans. This suggests a lack of sufficient financial resources at the community level, which can hinder the implementation and execution of comprehensive disaster preparedness initiatives.

Another challenge mentioned is that community-level efforts have not reached their full potential. This indicates that there may be limitations or barriers preventing the community from fully utilizing their capabilities and resources to effectively implement disaster preparedness plans. These limitations could be related to factors such as knowledge gaps, limited access to training or resources, or insufficient coordination among community members.

Furthermore, political issues are noted as occasional obstacles to effective implementation. It implies that political factors, such as conflicts of interest, bureaucratic hurdles, or lack of political will, can interfere with the smooth execution of disaster preparedness plans at the community level. These political issues may create additional challenges and delays in implementing necessary measures and impede the community's ability to respond and recover from disasters efficiently.

To address these challenges, it is crucial to explore alternative funding sources and strategies for community-led disaster preparedness initiatives. This could involve seeking partnerships with non-governmental organizations, private sector entities, or international donors to supplement government funding and ensure sustainable financial support. Additionally, efforts should be made to enhance community capacity-building, knowledge dissemination, and training to empower community members to take an active role in disaster preparedness and response.

Furthermore, addressing political issues requires fostering strong collaboration and engagement between community leaders, local authorities, and relevant stakeholders. This can involve advocating for policy reforms, promoting transparent decision-making processes, and building consensus among different political actors to prioritize and support community-led disaster preparedness efforts.

In summary, the key challenges faced by the community in effectively implementing disaster preparedness plans include limited funding, incomplete utilization of community-level efforts, and occasional political hindrances. Overcoming these challenges requires exploring alternative funding sources, strengthening community capacity-building, and addressing political barriers through collaboration and advocacy. By addressing these challenges, the community can enhance its resilience and preparedness in the face of potential disasters.

5. The Steps that Can be Taken to Strengthen Community Capacity and Engagement in Order to Improve Disaster Preparedness

Several measures are highlighted as follows:

1. **Financial support**. It is emphasized that providing adequate funding is essential for supporting community-led disaster preparedness activities. Allocating resources specifically for these initiatives can enable the community to implement their preparedness plans effectively. Financial support can come from various sources, including government budgets, grants, partnerships with non-governmental organizations, or private sector contributions.
2. **Community organizing**. Organizing the community plays a vital role in strengthening their capacity and engagement in disaster preparedness. This involves bringing community members together, fostering collaboration, and establishing community-based organizations or committees dedicated to disaster

preparedness. These organized groups can serve as platforms for information sharing, coordination, and collective decision-making.

3. **Training for groups and individuals**. Providing training programs for both community groups and individuals is crucial in enhancing their knowledge and skills related to disaster preparedness. These training sessions can cover various aspects, such as hazard awareness, emergency response procedures, first aid, search and rescue techniques, and the proper use of disaster management tools and equipment. By equipping community members with the necessary knowledge and skills, their capacity to respond effectively to disasters is improved.
4. **Guidance and assistance from local government units**. Collaboration between the community and local government units is vital for effective disaster preparedness. Local government departments, such as the Regional Disaster Management Agency, Social Affairs Department, Environmental Department, and others, can provide guidance, technical assistance, and resources to support community-led initiatives. They can offer expertise, develop guidelines, and facilitate the implementation of preparedness plans at the community level.

By implementing these measures, community capacity and engagement in disaster preparedness can be strengthened. It enables community members to actively participate in identifying risks, developing preparedness plans, and implementing appropriate measures. Additionally, it fosters a sense of ownership, empowerment, and resilience within the community, allowing them to effectively respond to and recover from disasters.

Overall, enhancing community capacity and engagement requires a multi-faceted approach that involves financial support, community organizing, training programs, and guidance from local government units. By implementing these measures, communities can become more proactive and resilient in the face of disasters, contributing to improved disaster preparedness efforts.

C. Output 2.1: Community-Based Hazard Risk Information, Forecast, and Early Warning System developed

1. The Current Status of Hazard Risk Information and Early Warning Mechanisms Within the Community

Several key points are highlighted:

1. **Limited access to risk information**. It is mentioned that risk-related information is only available from the Regional Disaster Management Agency (BPBD). This suggests that there may be a centralized approach to disseminating hazard risk information, with the BPBD acting as the primary source. The community may have limited access to comprehensive and localized risk information, potentially hindering their ability to understand and respond effectively to hazards.
2. **Lack of information at the local level**. The information highlights that there is no easily accessible risk information at the neighborhood or district level. This indicates a gap in the availability and dissemination of hazard risk information at the local community level. Without localized risk information, community members may lack awareness of specific hazards and their potential impacts, making it challenging to plan and prepare accordingly.

3. **Absence of community-level risk assessments**. It is mentioned that the community does not conduct risk assessments at the community level. This suggests a lack of proactive efforts by the community to assess and understand the specific risks they face. Conducting risk assessments at the community level is essential for identifying vulnerabilities, prioritizing mitigation measures, and developing effective preparedness plans.

To address these issues, it is crucial to improve the accessibility and availability of hazard risk information at the community level. Efforts should be made to ensure that risk-related information is disseminated not only through the BPBD but also through local institutions, such as neighborhood or district offices. This would enable community members to access localized risk information easily and take appropriate measures to mitigate and respond to hazards.

Additionally, promoting community-level risk assessments is essential. Empowering the community to conduct their own risk assessments can enhance their understanding of local hazards, vulnerabilities, and capacities. This can inform the development of tailored preparedness plans, early warning systems, and response strategies that are specific to the community's needs and circumstances.

By improving hazard risk information and early warning mechanisms at the community level, communities can become more informed, proactive, and resilient in the face of hazards. Accessible and localized risk information, coupled with community-led risk assessments, can contribute to effective preparedness, mitigation, and response efforts, ultimately reducing the potential impacts of disasters.

2. The Accessibility and Reliability of Hazard Risk Information and Forecasting Data for the Community

The following key points are highlighted:

1. **Limited accessibility**. It is mentioned that the hazard risk information and forecasting data can only be accessed at the City Regional Disaster Management Agency (BPBD Kota). This suggests that the community may face challenges in obtaining this information directly. Limited accessibility can hinder community members' ability to have timely and relevant information to make informed decisions and take appropriate actions in response to potential hazards.
2. **Lack of information at the neighborhood (RT) level**. The information emphasizes that there is currently no information available at the neighborhood level. This indicates a gap in the availability of localized hazard risk information and forecasting data. Lack of neighborhood-level information may hinder the community's ability to understand the specific risks they face and take targeted measures to mitigate those risks effectively.

Improving the accessibility and reliability of hazard risk information and forecasting data is crucial for enhancing community preparedness and resilience. Here are some potential steps that can be taken:

1. **Dissemination of information**. Efforts should be made to ensure that hazard risk information and forecasting data are disseminated beyond the City Regional Disaster Management Agency (BPBD Kota). Information should be made accessible to the community at various levels, including the neighborhood level. This can be done through local government channels, community centers, online platforms, or other relevant outlets.

2. **Localized data collection and analysis**. Establishing mechanisms for collecting and analyzing hazard risk data at the neighborhood level can provide more accurate and relevant information for the community. This can involve conducting localized risk assessments, monitoring local weather patterns, and collaborating with community members to gather valuable insights and observations.
3. **Collaborative partnerships**. Building partnerships between the City Regional Disaster Management Agency (BPBD Kota) and neighborhood-level stakeholders, such as neighborhood associations or community organizations, can help improve the flow of information and data sharing. Collaborative efforts can enhance the reliability and accessibility of hazard risk information and forecasting data for the community.

By addressing the limitations in accessibility and reliability, communities can be better equipped to understand and respond to potential hazards. Accessible and reliable hazard risk information and forecasting data enable community members to make informed decisions, implement appropriate preparedness measures, and respond effectively to minimize the impacts of disasters.

3. The Effectiveness of Communicating and Disseminating Early Warning Messages to the Community

The following key points are highlighted:

1. **Prompt and concise information from BMKG**. It is stated that the information from the Meteorology, Climatology, and Geophysics Agency (BMKG) is delivered promptly and concisely. This suggests that BMKG provides timely updates and warnings about potential hazards. The use of concise messaging ensures that the information is clear and easily understood by the recipients.
2. **Limited accessibility to BMKG information**. The information highlights that not everyone has access to BMKG information. This implies that there may be limitations in terms of who can receive and access these early warning messages. It is important to address this limitation to ensure that all community members have equal access to crucial information that can help them prepare and respond to potential hazards.
3. **Dissemination through community WhatsApp groups**. The dissemination of early warning messages takes place through community WhatsApp groups. This indicates that community members rely on these groups as a primary means of receiving information, including early warnings from BMKG. Leveraging existing digital platforms like WhatsApp groups can be an effective way to reach a large number of community members quickly.

To improve the effectiveness of communicating and disseminating early warning messages to the community, the following steps could be considered:

1. **Widening access to information**. Efforts should be made to ensure that BMKG information is accessible to a broader range of community members. This could involve exploring alternative communication channels such as radio broadcasts, SMS alerts, or mobile applications that can reach individuals who may not have access to the internet or specific technologies.
2. **Diversifying dissemination methods**. While community WhatsApp groups are a useful tool for disseminating information, other communication channels should also be utilized. This can include leveraging local media

outlets, community meetings, public announcements, and collaboration with community leaders or influencers to spread early warning messages effectively.

3. **Strengthening collaboration with BPBD**. Building a strong partnership between BMKG and the Regional Disaster Management Agency (BPBD) is crucial. BPBD can play a pivotal role in disseminating early warning messages from BMKG to the community. By working together, both agencies can ensure that accurate and timely information reaches the community through various channels.

By enhancing the communication and dissemination of early warning messages, communities can be better prepared and equipped to respond to potential hazards. Timely and accessible information empowers community members to take necessary precautions, evacuate if required, and mitigate the impact of disasters, ultimately saving lives and reducing damage.

4. The Barriers or Limitations That Affect the Community's Understanding and Response to Early Warning Messages

The following key points are highlighted:

1. **Limited access to information**. It is mentioned that the community has limited access to information through mobile applications. This indicates that not all community members have smartphones or reliable internet access, which hinders their ability to receive and comprehend early warning messages. Limited access to information can significantly impede the community's preparedness and response to potential hazards.
2. **Uneven participation in WhatsApp groups**. The information highlights that there is uneven participation among community members in WhatsApp groups. This suggests that not everyone is actively engaged or included in these communication channels, potentially resulting in some individuals missing crucial early warning messages. Inclusive participation is required to ensure that early warning messages are received and understood by a diverse group of community members.
3. **Insufficient understanding of Early Warning Systems (EWS)**. It is mentioned that there is a lack of understanding about Early Warning Systems (EWS) among many community members. This implies that there might be limited awareness or knowledge about the purpose, significance, and appropriate responses to early warning messages. Insufficient understanding can hinder the community's ability to interpret and act upon early warnings effectively.

To address these barriers and improve the community's understanding and response to early warning messages, the following actions could be considered:

1. **Diversifying communication channels**. In addition to mobile applications, other communication channels should be utilized to ensure information reaches a wider audience. This can include radio broadcasts, SMS alerts, community meetings, and other traditional methods that are accessible to individuals without smartphones or internet access.
2. **Promoting inclusive participation**. Efforts should be made to promote the active and inclusive participation of community members in communication platforms such as WhatsApp groups. This can involve raising

awareness about the importance of early warning messages, encouraging community members to join relevant groups, and providing training or guidance on how to interpret and respond to early warnings.

3. **Enhancing public education and awareness**. It is crucial to invest in public education initiatives to improve the community's understanding of Early Warning Systems (EWS). This can be achieved through awareness campaigns, training workshops, and the distribution of educational materials that explain the purpose of early warnings, the significance of preparedness, and the appropriate actions to take in response to different hazards.

By addressing the barriers and limitations, the community's comprehension and response to early warning messages can be significantly improved. Accessible information, inclusive communication channels, and enhanced understanding of Early Warning Systems (EWS) empower community members to make informed decisions, take appropriate actions, and mitigate the potential impacts of hazards.

5. Strategies to Enhance Community Participation and Ownership In Hazard Risk Information and the Early Warning System

The following key points are highlighted:

1. **Awareness campaigns by BMKG or neighborhood organizations**. It is suggested that conducting awareness campaigns by the Meteorology, Climatology, and Geophysics Agency (BMKG) or through neighborhood-level organizations (RT/RW) is crucial. These campaigns can focus on educating the community about the Early Warning System (EWS), its importance, and how individuals can actively participate and take ownership in responding to early warning messages. Such campaigns can help increase community engagement and understanding.
2. **Cascading message system or information tree**. The information suggests developing a cascading message system or an information tree that disseminates information from top to bottom. This approach ensures that the information flows efficiently and effectively throughout the community, reaching individuals at various levels, such as community leaders, neighborhood associations, and individual households. By establishing a clear communication structure, community members can receive timely and accurate hazard risk information.
3. **Neighborhood-level policies for information dissemination**. Establishing policies at the neighborhood level regarding information dissemination is important. These policies can outline guidelines and procedures for sharing early warning messages and ensuring that the information reaches all community members. By having formal policies in place, there is a higher likelihood of consistent and inclusive information dissemination practices across the neighborhood.

Implementing these strategies can enhance community participation and ownership in the hazard risk information and early warning system. The following benefits can be expected:

1. **Increased community engagement**. Awareness campaigns and community-level initiatives foster active community participation. When individuals are well-informed and understand their role in the early warning system, they are more likely to engage and take ownership in preparing for and responding to hazards.

2. **Improved information flow**. The cascading message system or information tree ensures that hazard risk information is efficiently disseminated throughout the community. This reduces the chances of information gaps and ensures that timely warnings reach all community members, allowing them to take appropriate actions.
3. **Consistent and inclusive dissemination**. Neighborhood-level policies for information dissemination establish clear guidelines for sharing early warning messages. This promotes consistent practices and ensures that information reaches all segments of the community, including vulnerable populations who may have limited access to communication channels.

By implementing these strategies, communities can enhance their resilience to hazards by actively engaging community members, improving information flow, and ensuring that early warning messages reach all individuals. This empowers the community to take proactive measures, make informed decisions, and respond effectively to minimize the impacts of potential disasters.

D. Output 2.2: Emergency financing process and plan informed to the community and stakeholders.

1. The Level of Familiarity Among Community Members and Relevant Stakeholders Regarding Emergency Financing Processes and Plans

The following key points are highlighted:

1. **Limited understanding of emergency funding**. It is stated that community members and stakeholders have a limited understanding of emergency financing. This suggests that there is a lack of knowledge about the financial mechanisms and processes involved in allocating funds for emergency situations. This knowledge gap can hinder effective financial planning and resource allocation during times of crisis.
2. **Focus on development budgets**. The information mentions that community members' understanding is primarily centered around development budgets. They are familiar with the budgets communicated by the neighborhood head (Lurah) or the head of neighborhood associations (RT/RW) regarding specific activities or programs. This indicates that their awareness of financial matters is primarily directed towards non-emergency initiatives rather than emergency financing.
3. **Limited comprehension of financial management in emergencies**. The community's understanding of emergencies is primarily associated with receiving aid. However, it is highlighted that there is a lack of comprehension regarding financial management in emergency situations. This suggests that community members may not possess the necessary knowledge and skills to effectively handle financial resources during emergencies, including budgeting, expenditure tracking, and financial accountability.

To address these gaps and enhance community members' and stakeholders' familiarity with emergency financing processes and plans, the following steps could be considered:

1. **Education and training**. Providing education and training sessions on emergency financing can help improve community members' understanding of the subject. These sessions can cover topics such as emergency fund allocation, financial planning during crises, and resource management. Stakeholders, including neighborhood leaders and relevant community organizations, should be included in these initiatives.

2. **Communication and transparency**. Enhancing communication and transparency regarding emergency financing processes and plans is crucial. Clear and accessible information should be provided to community members and stakeholders, explaining the procedures for accessing emergency funds, the criteria for eligibility, and the financial management practices that need to be followed. This can help foster a better understanding of the available resources and the responsibilities associated with emergency financing.
3. **Collaborative decision-making**. Involving community members and stakeholders in decision-making processes related to emergency financing can foster a sense of ownership and increase their familiarity with the associated processes and plans. Establishing mechanisms for community participation and consultation can help ensure that the financial decisions align with the needs and priorities of the community.

By implementing these strategies, community members and relevant stakeholders can become more informed and knowledgeable about emergency financing processes and plans. This can contribute to better financial preparedness, effective resource allocation, and improved financial management during emergencies, ultimately enhancing the community's resilience and response capabilities.

2. The Existing Financial Coping Mechanisms or Initiatives Within the Community

The following key findings are highlighted:

1. **Savings and loans in cooperatives or banks**. It is mentioned that some community members have savings and loans in cooperatives or banks. These financial resources are typically set aside and utilized when a disaster occurs. This suggests that these individuals have taken proactive measures to financially prepare for unexpected events and have established a mechanism to access funds during times of crisis.
2. **Reliance on government assistance or external aid**. The information states that many community members do not have savings and solely rely on government assistance or external aid. This indicates that a significant portion of the community does not have personal financial reserves to cope with emergencies. Instead, they depend on support from the government or other external sources to meet their financial needs during crises.

To further analyze the situation, it is evident that there is a disparity within the community regarding financial coping mechanisms:

1. **Strengths**. Community members who have savings and loans in cooperatives or banks possess a degree of financial resilience. They are better equipped to handle unexpected expenses and emergencies, as they have access to their own funds. This demonstrates a proactive approach to ensuring financial stability during times of crisis.
2. **Challenges**. The reliance of many community members on government assistance or external aid reveals a vulnerability in terms of financial preparedness. Relying solely on external support may lead to delays in receiving assistance or limited access to resources, depending on the availability and effectiveness of aid channels. This highlights the need for additional strategies to enhance financial resilience within the community.

To address these challenges and improve financial coping mechanisms within the community, the following steps could be considered:

1. **Financial literacy and inclusion**. Providing financial education and promoting financial inclusion can empower community members to develop their own financial coping mechanisms. This can involve initiatives such as financial literacy programs, promoting savings habits, and facilitating access to formal financial services.
2. **Community-based savings and credit schemes**. Encouraging the establishment of community-based savings and credit schemes can provide an alternative financial safety net. These schemes can be designed to facilitate savings and provide access to loans within the community, allowing members to support each other during emergencies.
3. **Strengthening social support networks**. Enhancing community networks and social support systems can help fill gaps in financial coping mechanisms. This can involve fostering mutual aid groups, encouraging community solidarity, and promoting mechanisms for sharing resources and support during crises.

By implementing these strategies, the community can enhance its financial resilience and reduce dependency on external aid. Empowering community members to build their own financial coping mechanisms can lead to increased self-reliance, faster response in times of crisis, and improved overall disaster preparedness.

3. The Gaps in Knowledge and Understanding Among the Community Regarding Available Options For Emergency Financing

The following key findings are emphasized:

1. **Lack of awareness**. It is stated that the gaps in knowledge and understanding are significant. This suggests that the community lacks awareness or information about the existence and availability of emergency financing options. This lack of awareness can hinder the community's ability to access and utilize financial resources during times of crisis.
2. **Specifically related to risk financing**. The information mentions that the knowledge gap is primarily attributed to the community's lack of understanding about risk financing. Risk financing refers to strategies and mechanisms that enable individuals, organizations, or communities to manage and transfer financial risks associated with emergencies or disasters. The community's limited knowledge in this area indicates a lack of familiarity with the financial tools and mechanisms available to address emergency situations.

To further analyze the situation, it is important to consider the implications of these knowledge and understanding gaps:

1. **Limited financial preparedness**. The lack of knowledge about available emergency financing options can result in limited financial preparedness within the community. Without understanding the financial tools and strategies available, community members may not be able to adequately plan for emergencies or allocate resources effectively when a crisis occurs. This can lead to increased financial vulnerability and challenges in responding to and recovering from emergencies.

2. **Missed opportunities for risk mitigation**. The knowledge gaps regarding risk financing indicate missed opportunities for the community to mitigate and manage financial risks associated with emergencies. By being unaware of available options, the community may not be able to take advantage of measures such as insurance, contingency funds, or other financial instruments that can help reduce the financial impact of emergencies.

Addressing the knowledge and understanding gaps regarding available emergency financing options is crucial. This can be done through the following measures:

1. **Education and awareness campaigns**. Conducting education and awareness campaigns within the community can help disseminate information about available emergency financing options. These campaigns can focus on explaining the concept of risk financing, highlighting the benefits and importance of financial preparedness, and providing guidance on accessing and utilizing emergency funds.
2. **Collaboration with local authorities and financial institutions**. Collaborating with local authorities, financial institutions, and relevant stakeholders can facilitate the dissemination of information about emergency financing options. This can involve organizing workshops, seminars, or information sessions where community members can learn about the financial tools and mechanisms available to them.
3. **Community-based support systems**. Establishing community-based support systems, such as peer-to-peer learning networks or mentorship programs, can help bridge the knowledge gap. Community members with knowledge or experience in emergency financing can share their expertise with others, fostering a culture of learning and preparedness within the community.

By addressing these knowledges and understanding gaps, the community can improve its financial resilience and preparedness for emergencies. Enhancing awareness and knowledge about emergency financing options can empower community members to make informed financial decisions, allocate resources effectively, and minimize the financial hardships associated with emergencies.

4. The Effectiveness of Communicating and Disseminating Emergency Financing Options to the Community

The following key findings are highlighted:

1. **Importance for all sectors**. It is stated that both the community and the government recognize the significance of effectively communicating and disseminating emergency financing options. This implies that all segments of society, including individuals, organizations, and government entities, acknowledge the importance of ensuring that information about available financial resources during emergencies reaches the community.
2. **Aid in emergency preparedness**. The finding mentions that effective communication and dissemination of emergency financing options contribute to action planning for emergency preparedness. By providing the community with information about available financial resources, individuals and organizations can better plan and prepare for emergencies, including allocating funds, arranging insurance coverage, or accessing loans or grants.

3. **Need for a strict system**. It is emphasized that a strict system is necessary to minimize misappropriation or mismanagement of emergency funds. This indicates the recognition of potential risks associated with the dissemination and utilization of emergency financing options. To ensure transparency, accountability, and proper utilization of funds, a robust system should be in place to prevent any potential misuse or mishandling.

To further analyze the situation, it is important to consider the implications of effective communication and dissemination of emergency financing options:

1. **Enhanced preparedness**. When emergency financing options are effectively communicated and disseminated, it improves the overall preparedness of the community. Individuals and organizations can make informed decisions and take appropriate actions to secure financial resources in advance, enabling them to respond promptly and effectively during emergencies.
2. **Transparency and accountability**. Effective communication and dissemination of emergency financing options promote transparency and accountability. By establishing clear channels of communication and ensuring that accurate information reaches the community, it becomes easier to track the flow of funds, monitor their utilization, and hold relevant parties accountable for proper financial management.
3. **Mitigation of mismanagement risks**. Having a strict system in place helps mitigate the risks of misappropriation or mismanagement of emergency funds. By implementing robust financial management protocols, conducting regular audits, and enforcing accountability measures, the likelihood of funds being misused or mishandled is reduced, ensuring that resources are directed towards their intended purpose.

To ensure effective communication and dissemination of emergency financing options, the following measures can be considered:

1. **Clear and accessible information**. Emergency financing options should be communicated in a clear and easily understandable manner. Information should be readily accessible through various channels, such as websites, public announcements, community meetings, and educational campaigns.
2. **Collaboration between stakeholders**. Effective communication requires collaboration among various stakeholders, including government agencies, financial institutions, community organizations, and local authorities. By working together, these stakeholders can pool their resources, expertise, and networks to ensure that information reaches the community effectively.
3. **Training and capacity building**. Providing training and capacity-building programs can enhance the ability of community members, government officials, and financial service providers to effectively communicate and disseminate emergency financing options. This can include workshops on communication strategies, financial literacy, and risk management.

By implementing these measures, the community can benefit from improved awareness, accessibility, and understanding of emergency financing options. Effective communication and dissemination contribute to better emergency preparedness, transparency, and accountability in financial management, ultimately strengthening the community's resilience in the face of emergencies.

5. Ways to Improve Community Understanding and Stakeholder Engagement In Emergency Financing Mechanisms

The following key findings are highlighted:

1. **Awareness campaigns and training**. It is stated that conducting awareness campaigns and providing training related to risk financing mechanisms is essential. These initiatives aim to educate the community and stakeholders about the available emergency financing options, their benefits, and how to access and utilize them. By increasing awareness and knowledge, community members and stakeholders can make informed decisions regarding emergency financing.
2. **Importance of fund allocation**. The information emphasizes that proper allocation of funds is the most crucial aspect. This suggests the recognition of the significance of effectively managing and distributing emergency funds. Ensuring that funds are allocated appropriately helps maximize their impact and ensures that financial resources reach those who need them the most.

To further analyze the situation, it is important to consider the implications of improving community understanding and stakeholder engagement in emergency financing mechanisms:

1. **Empowered decision-making**. By enhancing community understanding of emergency financing mechanisms, individuals and organizations can make more informed decisions. They can assess available options, evaluate their financial needs and risks, and choose the most suitable financing mechanisms to address emergencies. This empowers them to take control of their financial preparedness and response.
2. **Enhanced collaboration and coordination**. Improving stakeholder engagement in emergency financing mechanisms fosters collaboration and coordination among different entities involved in emergency response and recovery. When stakeholders are well-informed and engaged, they can work together more effectively, share resources and expertise, and align their efforts to optimize the use of emergency funds.

To improve community understanding and stakeholder engagement in emergency financing mechanisms, the following measures can be considered:

1. **Awareness campaigns**. Conduct targeted awareness campaigns to inform the community about the available emergency financing mechanisms. These campaigns should explain the purpose, eligibility criteria, application process, and benefits of each mechanism. Utilize various communication channels, such as public meetings, social media, and informational materials, to reach a broader audience.
2. **Training and education**. Provide training programs and workshops to educate stakeholders, including community members, government officials, and financial institutions, about emergency financing mechanisms. These sessions can cover topics such as risk management, financial planning, and accessing emergency funds. Additionally, emphasize the importance of proper fund allocation and financial management.
3. **Stakeholder involvement**. Encourage stakeholder involvement in the decision-making and implementation processes related to emergency financing mechanisms. This can be achieved through regular consultations, feedback mechanisms, and participation in relevant committees or working groups. By involving

stakeholders, their perspectives and expertise can be incorporated, leading to more effective and inclusive emergency financing strategies.

By implementing these measures, community understanding and stakeholder engagement in emergency financing mechanisms can be improved. Increased awareness, knowledge, and collaboration among stakeholders contribute to better financial preparedness, response, and recovery during emergencies. Additionally, ensuring proper allocation of funds helps maximize the impact of emergency financing and ensures that resources are utilized effectively.

E. Output 3.1: The vulnerable group needs to be assessed

The residents of four sub-districts in Makassar City perceive vulnerable individuals as those who lack access and are often helpless, such as urban poor, marginalized people with disabilities, elderly individuals without family support, destitute widows, and isolated or family-less sick individuals. The local government defines the vulnerable group category as including marginalized communities, the elderly, unaccompanied individuals with disabilities, and those lacking access to government services. However, the LGBTQI+ community in these sub-districts is not considered vulnerable by the local residents as they have their own community and economic activities. Although assimilation into society is limited, both society and the government recognize their right to receive equal services. Additional efforts are required to involve them in the CLEAR program activities to ensure that disaster risk understanding and anticipatory efforts towards the program receive support from all development stakeholders in the target area.

Regarding challenges and concerns for vulnerable groups in the context of changing disasters, the community and local government believe that individuals working outdoors may face greater health risks due to extreme heat or rain. People with illnesses, asthma, or lung diseases may be more susceptible to air pollution. Older adults with limited mobility may struggle to adapt or respond to extreme weather conditions. During floods, individuals with disabilities and the elderly encounter difficulties in evacuating, necessitating assistance from families and communities trained to aid and evacuate vulnerable groups.

In terms of understanding the needs of vulnerable groups, the community emphasizes the importance of providing training to promote mutual sensitivity and understanding of differences in capacity and needs, particularly for vulnerable groups and people with disabilities. The local government and communities in the two sub-districts believe that livelihood support should be provided through micro, small, and medium-sized enterprises (MSMEs) or similar initiatives. If feasible, government insurance services can be offered, especially for vulnerable communities. Special training programs should also be implemented to help vulnerable groups comprehend preparedness and take anticipatory actions when facing disasters.

Understanding the needs of vulnerable groups is considered crucial. The community emphasizes the necessity of training programs to promote sensitivity and understanding of differences in capacity and needs. Furthermore, livelihood support, government insurance services, and specialized training programs are identified as essential measures to address the needs of vulnerable groups.

Overall, the analysis underscores the importance of recognizing and addressing the specific needs and challenges faced by vulnerable groups in the context of disasters. It emphasizes the significance of inclusive approaches, training programs, and support systems to ensure the well-being and resilience of vulnerable individuals and communities.

Anticipatory action and early action are two different approaches in disaster response within the context of an Early Warning System (EWS).

1. **Anticipatory action**: Anticipatory action involves taking preventive measures to reduce the impact of an impending disaster. This approach is based on forecast-based early warning, which utilizes early warning information to predict when and where a disaster will occur, enabling decision-makers to take action before the event takes place. Examples of anticipatory action include prepositioning emergency supplies, evacuating people from high-risk areas, and strengthening infrastructure in vulnerable locations.
2. **Early action**: Early action involves taking steps to reduce the impact of a disaster after it has occurred but before it fully develops. This approach is based on early detection of the disaster and taking immediate action to mitigate its impact. Examples of early action include search and rescue operations, providing emergency relief supplies to affected communities, and establishing temporary shelters for IDPs.

In summary, anticipatory action focuses on preventing or reducing the impact of a disaster before it occurs, while early action focuses on responding to a disaster that has already occurred but is still in its early stages. Both approaches are important in disaster risk management and can be used in conjunction to create comprehensive disaster response plans.

Here are some examples of anticipatory action that can be taken within the context of an Early Warning System (EWS) for disasters:

- Prepositioning emergency supplies: Anticipatory action can involve prepositioning emergency supplies like food, water, medicines, and shelter materials in high-risk areas prone to disasters. These supplies can be quickly mobilized and distributed to affected communities if a disaster occurs.
- Disseminating early warning information: Anticipatory action can involve disseminating early warning information to at-risk communities so they can take action to prepare for the disaster. This can be done through radios, SMS messages, and other communication channels to reach as many people as possible.
- Contingency planning: Anticipatory action can involve developing contingency plans for various disaster scenarios. These plans can identify potential risks, establish response strategies, and allocate resources in advance to ensure timely and effective response efforts.
- Infrastructure strengthening: Anticipatory action can involve strengthening critical infrastructure such as bridges, buildings, and power plants to make them more resilient to the impacts of disasters. This can involve retrofitting buildings with earthquake-resistant features or reinforcing flood defenses.
- Early warning-triggered activities: Anticipatory action can involve activities triggered by early warning information, such as evacuation drills or stockpiling emergency supplies.
- Early warning trigger mechanisms: Anticipatory action can involve setting up trigger mechanisms that automatically initiate response actions when early warning thresholds are exceeded. For example, if a Drought Early Warning System indicates that an area is at risk of severe drought, trigger mechanisms can be established to activate measures such as seed and fertilizer distribution or water trucking to ensure these actions are implemented in a timely manner.

Overall, anticipatory action is an important tool in disaster risk management that can help communities and decision-makers prepare for disasters before they occur and reduce their impact on vulnerable populations. By taking proactive action based on early warning information, the impact of disasters can be mitigated, and lives can be saved. Anticipatory action can complement other disaster risk management approaches such as early action, prevention, and preparedness to create comprehensive disaster response plans.

Here are some examples of early action that can be taken within the context of an Early Warning System (EWS) for disasters:

1. Search and rescue: In the event of an earthquake, flood, or other sudden-onset disaster, search and rescue operations can be promptly conducted to locate and rescue trapped or injured individuals.
2. Emergency assistance: Early action can involve providing emergency relief supplies such as food, water, and shelter to affected communities. These supplies can be pre-positioned in high-risk areas to ensure quick distribution in case of a disaster.
3. Evacuation: If an Early Warning System predicts an impending disaster, early action can involve evacuating people from high-risk areas to safer locations. This can be done using transportation means like buses and boats or by setting up temporary shelters in secure locations.
4. Dissemination of early warnings: Early action can involve disseminating early warning information to at-risk communities so that they can take actions to prepare for the disaster. This can be done using radios, SMS messages, and other communication channels to reach as many people as possible.
5. Infrastructure strengthening: In anticipation of an upcoming disaster, early action can involve strengthening critical infrastructure such as bridges, buildings, and power plants to make them more resilient to the impacts of the disaster.

Overall, early action is a crucial component of disaster risk management that can help reduce the impact of disasters on vulnerable populations. By taking immediate action in the early stages of a disaster, lives can be saved, and communities can be supported in their recovery efforts. Early action can complement other disaster risk management approaches such as anticipatory action, prevention, and preparedness to create comprehensive disaster response plans.

VI. Recommendations for Project Interventions and Strategies

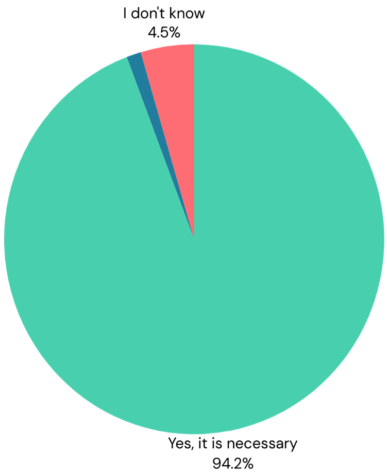
Respondent Aspiration and Concern

At the community level, both the residents and the local government officials, during the Focus Group Discussion (FGD), stated that their greatest hope for the program to be implemented by INANTA is to minimize the impacts of climate change, particularly floods, in their environment. However, they acknowledge that achieving this goal requires collaborative efforts from various levels of government, including the city, provincial, and national levels. The community perceives that the main factors influencing flood-related issues are infrastructure facilities such as river basin and drainage management, as well as land use changes in the upstream areas. However, at the community level, they still require support to minimize the flood impacts on the residents, through capacity building and the provision of adequate facilities. According to the survey results, 94% of the respondents stated that they need programs to strengthen community preparedness. Strengthening community preparedness can be achieved through activities that enhance knowledge and awareness, provide easily understandable preparedness information, establish emergency response facilities, form disaster response groups, conduct preparedness training, and advocate for better policies.

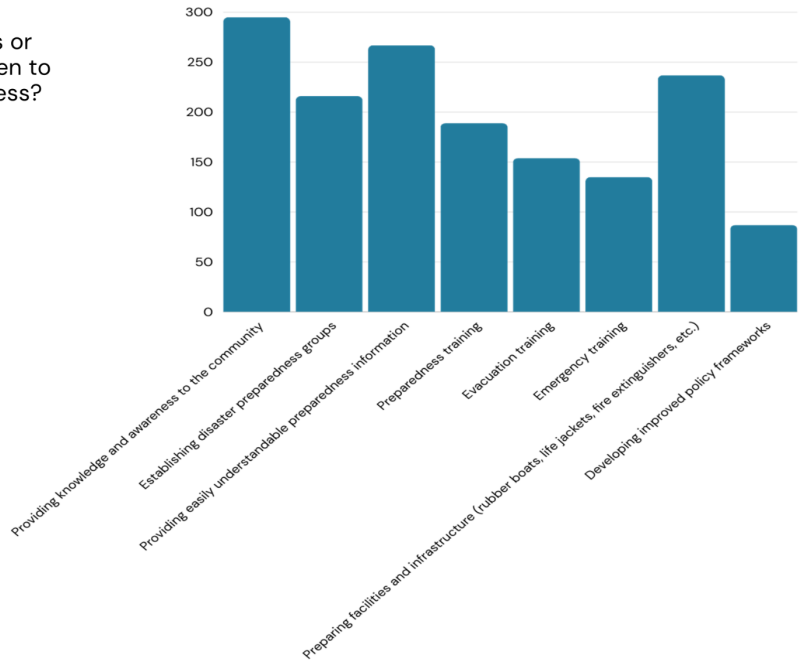
The community and local government officials recognize the need for joint efforts and collaboration among different levels of government to mitigate the impacts of climate change, particularly floods. They identify infrastructure facilities, such as river basin and drainage management, as well as land use changes, as the key factors influencing flood-related issues. However, they also acknowledge that community-level support is necessary to effectively minimize flood impacts on residents. This support involves capacity building measures and the provision of adequate facilities. The survey results reveal a strong demand for programs that strengthen community preparedness, indicating the community's recognition of the importance of being prepared for disasters. Such preparedness can be achieved through various activities focused on enhancing knowledge, awareness, and accessibility of preparedness information, as well as establishing emergency response infrastructure, forming disaster response groups, conducting training programs, and advocating for improved policies. The information underscores the importance of community engagement, capacity building, and coordinated efforts between different stakeholders to address climate change impacts and enhance community resilience.

Figure 19 The respondent's aspirations and concerns

• In your opinion, is there a need for community preparedness strengthening programs?



If necessary, what programs or activities should be undertaken to build community preparedness?



Efforts to support participation from vulnerable groups so their voices can be heard is an essential strategy in this program. Communities in four sub-districts and related city governments consider the direct involvement of the general public and government elements in the community as an excellent strategy. This is as important as efforts to involve vulnerable groups in every sub-district activity, especially to anticipate disasters. It was also conveyed that it is necessary to consider developing project activities that can actively involve vulnerable groups in disaster preparedness efforts, such as evacuations and activities in Internally Displaced People's camps and

public kitchens. This includes flexible risk funding support. For specific disabilities, such as being deaf and mute, they need the help of a sign language interpreter so that they can understand and other people can understand what they want to convey, camps and kitchens including flexible risk funding support.

General Recommendation

INANTA and CWS Indonesia are developing the Community-based Anticipatory Action program, or CLEAR, a three-year program targeting four sub-districts in Makassar City. The main aim of this program is to strengthen the resilience of Makassar city residents in facing the impacts of climate change. This program aims to achieve three main changes, i.e.:

(1) Knowledge, understanding, motivation, and ability of community members to increase the assessment capacity on the climate and disaster vulnerability and to act independently.

(2) Projected disaster impacts can be mitigated proactively through the implementation of successful anticipatory action and strengthening the early warning system (EWS), and

(3) Increase community access to alternative livelihoods in reducing the impact of disasters and other triggers of displacement.

Based on analysis of the survey that has been carried out, all target sub-districts are areas that are prone to hydrometeorological threats such as floods, droughts and swirl winds. Despite this, public knowledge and understanding still need to be improved, especially regarding the issues of climate change, DRR and disaster anticipation actions. Communities from the four sub-districts have felt the impacts of climate change, such as long-term changes in temperature/droughts, flooding, air pollution and extreme weather. It is hoped that the sub-district government and related government agencies can allocate a budget to participate in early action/anticipatory action activities over the next three years. Appropriate assessments of climate, vulnerability and community capacity must be the basis of action plans for communities and sub-district/sub-district governments up to Makassar City.

In the future, CLEAR project will be sustainable after three years of implementation. At the sub-district level, it was found that knowledge and understanding about disasters, climate change adaptation and early action on disasters still needed to be higher; however, at the city government level, there was a national program that could support the activities of the CLEAR program. This needs to be followed up by the target community by forming a DRR-Forum or Disaster Preparedness Group, which will become actors in preparedness efforts and develop anticipatory actions for disasters. The priority for regional development in the future will be the entry point for integrating DRR, CCA and anticipatory action activities. Therefore, it is essential to support the preparation of Disaster Management Action Plans and contingency plans. This includes supporting the City Government's Disaster Management Plan and Contingency Planning. All of this planning is needed to develop a series of early action activities that are inclusive, environmentally friendly, effective, and more cost-effective.

To measure the achievements and results targeted in the CLEAR program, a baseline study was conducted to determine the initial situation of program implementation. Based on the findings and discussions, the following is a brief overview of various initial problems of the program based on the program framework:

Table 8 Initial problems based on the program framework

Logical Framework	Program target in year-3	Baseline study results
Objective: Strengthening the resilience of Makassar city residents in facing the impacts of climate change		
Outcome 1: 1) Knowledge, understanding, motivation, and ability of community members to increase the assessment capacity on the climate and disaster vulnerability and to act independently	● An integrated, community-based climate change adaptation (CCA) approach is implemented ● Subdistrict Disaster Risk Management Plan and Contingency Planning implemented	● There is no community-based approach that is integrated with climate change adaptation efforts. ● There is not yet sufficient knowledge, and there are no policy documents regarding disaster risk management plans and contingency plans or anticipatory actions at the sub-district level. ● There are no community groups that consistently carry out climate-smart economic activities due to limited knowledge and skills related to climate change

Outcome 2 (2) Projected disaster impacts can be mitigated proactively through the implementation of successful anticipatory action and strengthening the early warning system (EWS)	• Anticipatory actions through the financing process are implemented • Implementation of Community-Based Disaster Risk Information, Forecasting and Early Warning Systems	• There is no anticipatory or early action planning. There is also no flexible financing plan at the sub-district level. No DRR-Forum or disaster preparedness group will become an actor in developing CCA, DRR and Anticipatory Action Efforts. • There have been efforts to disseminate EWS through the WA Group from the city government to sub-districts, including to communities with access. However, not all people can access EWS information, and not all can understand it.
Outcome 3: Increase community access to alternative livelihoods in reducing the impact of disasters and other triggers of displacement.	• Climate resilience - Alternative livelihoods implemented and reviewed	• There have been CVCA activities and initial studies of the CLEAR program. However, this study has yet to go in-depth into the study of community alternative livelihoods, including future development strategies.

The findings and discussions led to the formulation of several recommendations for the CLEAR program, including:

1. **Developing comprehensive and inclusive CCA/DRR and anticipatory action efforts**, including preparing community action plans that includes risk financing and an early warning system targeting floods and drought hazards. The study results show that floods and drought are the main hazards that worry people the most because they significantly impact their lives. The active involvement of individuals and community groups,

including young people at the village level, in various anticipatory action activities will further introduce this issue to the entire community and the younger generation, as well as encourage youth movements at the village level to contribute to CCA and DRR efforts through anticipatory action.

2. **Developing patterns of anticipatory action for each community group,** such as children, young people, women, vulnerable workers and other community groups, need to be identified together so that there is a sense of ownership in early action and disaster preparedness activities in the four sub-districts and contribute to sustainable development. Inclusive, environmentally friendly and sustainable.
3. **Identify and select media for information dissemination related to EWS,** climate change and disaster issues by the target recipients and the level of achievement to be achieved. Using social media can be one way to target children or young people. However, it is also necessary to ensure that vulnerable groups, PwD and LGBTQI+ groups and other marginalized groups can access relevant information. The information must be easy to understand, combining technical/scientific information and local knowledge.
4. Identify and select media for A feedback mechanism through the handling complaint and feedback mechanism (HCFM) must also be developed so that the public can ask questions about the CLEAR program, including its accountability.
5. **Implementation of disaster simulations needs to be based on risk assessments and mitigation** that are prepared and mutually agreed upon between the community and the Village/Sub-district government. This is to ensure that all participants involved, especially children, pregnant women, lactating mothers, the elderly and groups with disability, can be protected during simulation activities.
6. **Developing the MEAL system** must be based on the principles of evidence-based programming and Results-based Management. The focus of measurement is not only on the number of people who participate in training or outreach activities but also on changes in knowledge/skills that occur due to participating in training activities, including the involvement of GEDSI issues in implementation.
7. **Various activities developed at the sub-district level,** especially in the activities of forming DRR Forums/Disaster Preparedness Groups, CVCA and preparing action plans/risk financing plans at the sub-district or sub-district level, need to involve the City and even Provincial level FPRB, Social Services, BPBD, Environmental Services and PMD Department. This ensures that various sectoral programs owned by multiple related agencies can be integrated through the CLEAR program framework. This is also part of the CLEAR program's branding awareness strategy as an integrated and inclusive work model based on and led by the community.

VII. Conclusion

1. Stakeholders' capacity for disaster management and reduction remains limited, particularly among vulnerable and impoverished populations in slum areas. These groups face increased risks due to low economic capacity, education level, and limited knowledge of risk-based decision-making and preparedness. Vulnerable groups, including women, children, persons with disabilities, and LGBTQ+ individuals, are often excluded from discussions and policy-making processes related to these issues. Despite these challenges, the initiatives demonstrate Makassar's dedication to improving disaster management and reduction capabilities in response to climate change risks. To further address these issues, a proposed project aims to involve poor and vulnerable communities in understanding hazards, strengthening early warning systems, and implementing climate change adaptation actions to build resilience and mitigate disaster impacts.
2. Makassar, a city in Indonesia, has a diverse urban ecosystem consisting of islands, mangroves, mudflats, and coral reefs. The city is vulnerable to climate change hazards such as floods, storm surges, and seawater intrusion. To address these risks, the government has implemented disaster management initiatives and allocated a budget for disaster reduction. Makassar needs to balance economic growth with environmental protection, enhance disaster preparedness, and address water management challenges to ensure sustainable development.
3. In Makassar, Indonesia, the Biringkanaya and Manggala sub-districts have been severely affected by recurrent flooding. The flooding has caused material loss, disrupted community activities, led to environmental degradation, increased vulnerability to future flood events, and had negative economic impacts. The flooding is primarily attributed to heavy rainfall and extreme weather conditions. To address these issues, comprehensive measures are needed, including improved drainage systems, controlled urbanization, and relocation of residential buildings from flood-prone areas. The city government of Makassar has been implementing policies and initiatives to enhance climate resilience, such as early warning systems, flood control infrastructure, and community-based disaster risk reduction measures.
4. The findings highlight the real-life implications of climate change on the surveyed community and underscore the importance of developing appropriate adaptation and mitigation strategies to address these issues.
5. The analysis highlights the active participation of women and various demographic groups in community initiatives, emphasizing the need for inclusivity, empowerment, and recognition of their contributions to foster resilience and social cohesion.
6. Improving the dissemination and accessibility of early warning information is crucial, and oral communication, social media, messaging applications, and television are identified as channels through which respondents receive early warning information. Strengthening community-based early warning systems and enhancing communication networks are essential for effective preparedness and response to hydro-meteorological hazards.
7. Community-level preparedness initiatives contribute to resilience and effective response. Promoting community participation, strengthening local associations, and fostering collaboration with authorities and stakeholders are crucial for enhancing flood preparedness strategies.

8. Efforts should be made to ensure assistance reaches all affected residents and comprehensive support is provided for rebuilding livelihoods. Various sources provided economic recovery assistance, tailored to specific needs such as business capital, equipment, training, and premises. However, further clarification and understanding of the assistance provided in different forms are necessary. Documentation and communication should be improved to ensure transparency and understanding among stakeholders.
9. The lack of a monitoring mechanism for assistance provided during both the emergency response and recovery phases is a significant gap. Monitoring is crucial to ensure accountability and effectiveness in aid distribution. It helps track the utilization of aid, identify gaps, and evaluate its impact. Establishing a robust monitoring system with clear guidelines, regular reporting, and accountability measures is necessary. Active monitoring allows authorities to address issues, improve assistance processes, and build trust among beneficiaries and the community. Implementing an effective monitoring mechanism is essential for transparent, accountable, and impactful assistance delivery during disaster response and recovery.
10. The analysis highlights gaps and needs in the disaster risk management framework based on the project's logical framework. The needs can be categorized into areas such as financial resources, technical expertise, training, policy support, stakeholder engagement, and community participation. The gaps identified include the lack of community involvement in assessing vulnerability and evaluating current strategies, limited programs focusing on climate change awareness, and community members' limited understanding of the correlation between climate change and floods/droughts. However, community members express willingness to contribute and recognize the importance of collective action and external support. To address these gaps and needs, it is important to involve community members in assessments and decision-making processes, provide targeted programs and reliable information, address socioeconomic disparities, and foster partnerships and collaboration among stakeholders. By addressing these areas, the project can enhance community resilience and promote effective climate and disaster risk management.
11. To enhance community-led disaster preparedness, collective initiatives beyond flood mitigation are needed, including early warning systems, training, and coordination mechanisms. Strengthening community-led disaster preparedness involves integrating it with existing programs, fostering collaboration, addressing gaps, and providing support to enhance community capacity and engagement.
12. Communities can enhance their resilience to hazards by actively engaging community members, improving information flow, and ensuring that early warning messages reach all individuals. This empowers the community to take proactive measures, make informed decisions, and respond effectively to minimize the impacts of potential disasters.
13. Community understanding and stakeholder engagement in emergency financing mechanisms can be improved. Increased awareness, knowledge, and collaboration among stakeholders contribute to better financial preparedness, response, and recovery during emergencies. Additionally, ensuring proper allocation of funds helps maximize the impact of emergency financing and ensures that resources are utilized effectively.
14. It is essential to recognize and address the specific needs and challenges faced by vulnerable groups in the context of disasters. Inclusive approaches, training programs, and support systems are crucial to ensure the well-being and resilience of vulnerable individuals and communities.

15. Efforts to support the participation of vulnerable groups and ensure their voices are heard are considered crucial in the program. The communities in the four sub-districts and the city governments view the active involvement of the general public and government entities within the community as an effective strategy. It is equally important to involve vulnerable groups in all sub-district activities, particularly in disaster preparedness measures. Here are some specific ways this can be achieved:

Identifying Vulnerable Groups

- ***Conduct participatory vulnerability assessments***. Work with communities to identify specific groups who are more vulnerable to disasters due to factors like age, disability, socioeconomic status, gender, or ethnicity.
- ***Consult with local organizations***. Collaborate with NGOs, community-based organizations, and other groups working with vulnerable populations to understand their unique needs and challenges.

Strategies for Inclusion

- ***Use multiple communication channels***. Use a variety of communication methods beyond official meetings, such as community radio, SMS alerts, and door-to-door outreach, to reach those who may not easily access traditional channels.
- ***Organize accessible meetings***. Ensure meeting venues are physically accessible and provide transportation assistance if needed. Offer translation services and interpretation for individuals with disabilities or language barriers.
- ***Use inclusive language***. Use clear and concise language that is easy to understand for everyone, avoiding technical jargon or acronyms.
- ***Employ participatory methods***. Utilize participatory tools like focus group discussions, community mapping, and role-playing exercises to encourage active participation from all community members.
- ***Empower vulnerable groups***. Provide training and capacity building opportunities to help vulnerable groups advocate for their needs and participate meaningfully in decision-making processes.

VIII. Annexes

A. Data Collection Design and Analysis

Output	Objective	Study Design	Data Collection	Data Analysis	Recommendations
Outcome 1. Community members' knowledge, understanding, motivation, and ability to assess climate/disaster vulnerability and to act on their behalf, is enhanced					
Output 1.1: Community members are involved in assessing climate and disaster vulnerability and current strategies.	assess the current level of community engagement in assessing climate and disaster vulnerability and evaluating existing strategies	• Conduct a literature review to understand the existing knowledge and research on community engagement in assessing climate and disaster vulnerability. • Develop a framework for assessing community involvement, including indicators and data collection methods.	• Conduct surveys or interviews with community members to gauge their knowledge, understanding, and motivation regarding climate and disaster vulnerability. • Assess community members' involvement in existing strategies such as participatory risk assessments, early warning systems, and disaster preparedness plans. • Collect qualitative data through focus group discussions or community workshops to gather insights on community perceptions, needs, and challenges related to climate and disaster vulnerability.	• Analyze survey and interview data to determine the extent of community members' knowledge, understanding, and motivation in assessing vulnerability. • Assess the level of community involvement in current strategies, identifying strengths and areas for improvement. • Analyze qualitative data to identify common themes, barriers, and opportunities for enhancing community engagement.	• Based on the study findings, provide recommendations for enhancing community-led assessments of climate and disaster vulnerability. • Identify strategies to improve community understanding, motivation, and capacity to participate actively in vulnerability assessments. • Propose approaches to strengthen community involvement in developing and implementing disaster preparedness plans.
Output 1.2: Community-led disaster preparedness is established.	assess the current state of community-led disaster preparedness and identify areas for improvement	• Review existing literature and documentation on community-led disaster preparedness approaches. • Develop a framework for assessing the level of community-led disaster preparedness, including key indicators and data collection methods.	• Conduct surveys or interviews with community members to assess their knowledge, understanding, and involvement in disaster preparedness activities. • Evaluate the existing disaster preparedness plans and initiatives implemented by the community. • Collect data on the availability and accessibility of resources, such as emergency supplies, early warning systems, and evacuation plans.	• Analyze survey and interview data to determine the current level of community-led disaster preparedness. • Evaluate the effectiveness of existing plans and initiatives in promoting community resilience and response capabilities. • Assess the gaps and challenges hindering community-led disaster preparedness efforts.	• Based on the study findings, provide recommendations for strengthening community-led disaster preparedness. • Identify areas where community capacity can be enhanced, such as training programs and awareness campaigns. • Propose strategies for improving the accessibility and availability of resources necessary for effective disaster response at the community level.

Output 2.1: Community-Based Hazard Risk Information, Forecast, and Early Warning System developed.	assess the current status of hazard risk information, forecasting systems, and early warning mechanisms within the community	• Review existing literature, reports, and documentation on hazard risk information, forecasting systems, and early warning mechanisms. • Identify best practices and frameworks for community-based systems in hazard risk information, forecasting, and early warning.	• Conduct interviews or workshops with relevant stakeholders, including community members, local authorities, meteorological agencies, and disaster management organizations. • Assess the availability and accessibility of hazard risk information and forecasting data within the community. • Evaluate the existing early warning systems, including communication channels, dissemination methods, and community response protocols.	• Analyze the collected data to assess the current level of hazard risk information, forecasting systems, and early warning mechanisms. • Identify gaps, challenges, and limitations in the existing systems. • Evaluate the effectiveness of communication channels and dissemination methods in reaching and informing the community.	• Based on the study findings, provide recommendations for developing a community-based hazard risk information, forecasting, and early warning system. • Identify strategies to improve the accessibility and accuracy of hazard risk information. • Propose methods for enhancing community participation and ownership in the system, including community training and awareness programs.
Outcome 2. Projected disaster impact can be proactively mitigated through successfully anticipatory actions implementation and strength of early warning system					
Output 2.2: Emergency financing process and plan informed to the community and stakeholders.	assess the current understanding and awareness of emergency financing processes and plans among the community and relevant stakeholders	• Review existing documentation, policies, and guidelines related to emergency financing processes and plans. • Identify key stakeholders involved in emergency financing, including government agencies, NGOs, financial institutions, and community representatives.	• Conduct surveys, interviews, or focus group discussions with community members and stakeholders to assess their knowledge and understanding of emergency financing processes and plans. • Evaluate the level of awareness regarding available emergency financing mechanisms, eligibility criteria, and application procedures. • Identify any existing community-based financial coping mechanisms or initiatives.	• Analyze the collected data to assess the current understanding and awareness of emergency financing processes and plans. • Identify gaps and misconceptions in community knowledge and stakeholder engagement. • Evaluate the effectiveness of current communication and dissemination strategies in informing the community about emergency financing options.	• Based on the study findings, provide recommendations for improving community understanding and stakeholder engagement in emergency financing mechanisms. • Develop educational materials and awareness campaigns to inform the community about available emergency financing options. • Propose strategies for enhancing coordination and collaboration among stakeholders to streamline emergency financing processes.
Outcome 3. Enhanced community access to alternative livelihood to reduce the impact of disaster and other displacement drivers					
Output 3.1: Vulnerable group needs to be assessed.	assess the needs of vulnerable groups within the community	• Conduct a literature review to understand the existing research and knowledge on vulnerable groups and their specific needs. • Develop a framework for	• Identify and define the vulnerable groups within the community, such as children, elderly individuals, persons with disabilities, women, ethnic minorities, or low-	• Analyze the collected data to identify the specific needs and challenges each vulnerable group faces. • Identify common themes, patterns, and gaps in the data	• Based on the study findings, provide recommendations for addressing the identified needs of vulnerable groups. • Develop targeted interventions and support

		assessing the needs of vulnerable groups, including indicators and data collection methods.	income households. ● Conduct surveys, interviews, or focus group discussions with representatives from each vulnerable group to gather information about their needs, challenges, and concerns. ● Engage with community organizations, NGOs, and local authorities working with vulnerable groups to gather additional insights and data.	to understand the overarching needs of vulnerable groups as a whole. ● Consider intersectional factors, such as gender, age, disability, or socioeconomic status, to capture the diverse needs within each vulnerable group.	mechanisms to address the specific challenges faced by each vulnerable group. ● Propose strategies for enhancing inclusivity, accessibility, and participation of vulnerable groups in community programs and initiatives.

B. Desk Review

Desk review key documents and resources to consider:

Overall framework and context:

- Reports and documentation on the target community: These could include community assessments, vulnerability profiles, disaster risk reduction plans, and socioeconomic data.
- National and regional policies and plans related to climate change adaptation, disaster risk reduction, and community engagement.
- Research articles and studies on community-based participatory approaches in disaster risk management, climate change adaptation, and emergency preparedness.
- Methodological literature on conducting vulnerability assessments, community surveys, and participatory workshops.

Specific outputs and activities:

Output 1.1: Community engagement in assessing climate and disaster vulnerability and evaluating existing strategies

- Research on methodologies for community-based vulnerability assessments, including participatory risk assessments and local knowledge integration
- Studies on the effectiveness of different strategies for engaging communities in disaster risk reduction planning and implementation
- Literature on challenges and opportunities for enhancing community participation in decision-making processes related to climate change and disaster preparedness

Output 1.2: Community-led disaster preparedness

- Articles and reports on successful examples of community-led disaster preparedness initiatives around the world.
- Research on factors influencing community resilience and capacity to respond to disasters.
- Literature on best practices for developing and implementing community-based early warning systems, evacuation plans, and disaster preparedness training programs.

Output 2.1: Community-Based Hazard Risk Information, Forecast, and Early Warning System

- Research on community-based early warning systems, including best practices for information dissemination, communication channels, and community response protocols.
- Studies on the role of traditional knowledge and local information systems in disaster risk reduction.

- Literature on the use of technology and innovation in supporting community-based early warning systems and improving information accessibility.

Output 2.2: Emergency financing process and plan informed to the community and stakeholders

- Research on community-based disaster financing mechanisms, microinsurance schemes, and social safety nets.
- Articles and reports on the role of NGOs and local organizations in facilitating access to emergency financial resources after disasters.
- Literature on communication strategies for raising awareness about emergency financing options and improving financial literacy among vulnerable communities.

Output 3.1: Vulnerable group needs to be assessed

- Research on the specific needs and challenges faced by different vulnerable groups in disaster contexts, such as women, children, elderly people, persons with disabilities, and marginalized communities.
- Studies on intersectionality and the compounding effects of various vulnerabilities during disasters.
- Literature on best practices for ensuring inclusivity and equitable participation of vulnerable groups in disaster risk reduction and community development initiatives.

C. FGDs

Focus Group Discussion Key Questions:

Output 1.1: Community members are involved in assessing climate and disaster vulnerability and current strategies.	• How engaged are community members in assessing climate and disaster vulnerability and evaluating existing strategies? • What factors motivate or hinder community members' participation in these assessments? • What are the key areas of knowledge and understanding that community members possess regarding climate and disaster vulnerability? • How do community members perceive their role in promoting resilience and taking action against climate and disaster risks?
Output 1.2: Community-led disaster preparedness is established.	• How well-established is community-led disaster preparedness in the current context? • What are the existing initiatives and plans implemented by the community to enhance disaster preparedness? • What are the strengths and weaknesses of the community-led disaster preparedness efforts? • What are the key challenges the community faces in effectively implementing disaster preparedness plans? • How can community capacity and engagement be strengthened to improve disaster preparedness?
Output 2.1: Community-Based Hazard Risk Information, Forecast, and Early Warning System developed.	• What is the current status of hazard risk information and early warning mechanisms within the community? • How accessible and reliable is the existing hazard risk information and forecasting data for the community? • How effectively are early warning messages communicated and disseminated to the community? • What are the barriers or limitations in the community's understanding and response to early warning messages? • What strategies can be implemented to enhance community participation and ownership in the hazard risk information and early warning system?
Output 2.2: Emergency financing process and plan informed to the community and stakeholders.	• How familiar are community members and relevant stakeholders with the emergency financing processes and plans? • What are the existing financial coping mechanisms or initiatives within the community? • What are the gaps in knowledge and understanding regarding available emergency financing options? • How effectively are emergency financing options communicated and disseminated to the community? • How can community understanding and stakeholder engagement in emergency financing mechanisms be improved?
Output 3.1: The vulnerable group needs to be assessed.	• Who are the vulnerable groups identified within the community, and what are their specific needs? • What are the challenges and concerns faced by each vulnerable group? • How can the community better address the needs of vulnerable groups in disaster and displacement situations? • What strategies can be implemented to enhance inclusivity and accessibility for vulnerable groups in community programs and initiatives? • How can the participation of vulnerable groups be improved to ensure their voices are heard and their needs are met?

D. KIIs

Key Informant Interview Key Questions:

General	● What is your institution's role(s) regarding disaster and climate change adaptation mitigation? ● What is your institution's existing agenda/program related to disaster and climate change adaptation mitigation? ● what is your institution's plan in the long run to handle those issues? ● what is your institution's approach and strategy to implement your agenda (partnership, regulation, budget, and method)? ● What is your challenge(s) in implementing your agenda?
Output 1.1: Community members are involved in assessing climate and disaster vulnerability and current strategies.	● How would you assess the current level of community engagement in ● assessing climate and disaster vulnerability and evaluating existing strategies? ● In your opinion, what are the main factors that motivate or hinder community members' participation in these assessments? ● What knowledge and understanding do community members possess regarding climate and disaster vulnerability? ● How do community members perceive their role in promoting resilience and taking action against climate and disaster risks?
Output 1.2: Community-led disaster preparedness is established.	● From your perspective, how well-established is community-led disaster preparedness in the current context? ● Can you describe any existing initiatives or plans implemented by the community to enhance disaster preparedness? ● What do you consider to be the strengths and weaknesses of the community-led disaster preparedness efforts? ● What are the key challenges faced by the community in effectively implementing disaster preparedness plans? ● How do you think community capacity and engagement can be strengthened to improve disaster preparedness?
Output 2.1: Community-Based Hazard Risk Information, Forecast, and Early Warning System developed.	● How would you assess the current status of hazard risk information and early warning mechanisms within the community? ● In your experience, how accessible and reliable is the existing hazard risk information and forecasting data for the community? ● How effectively are early warning messages communicated and disseminated to the community? ● What do you perceive as the barriers or limitations in the community's understanding and response to early warning messages? ● What strategies do you suggest for enhancing community participation and ownership in the hazard risk information and early warning system?
Output 2.2: Emergency financing process and plan informed to the community and stakeholders.	● How familiar are community members and relevant stakeholders with the emergency financing processes and plans? ● Can you provide information on any existing financial coping mechanisms or initiatives within the community? ● What gaps in knowledge and understanding exist regarding available emergency financing options? ● How effectively are emergency financing options communicated and disseminated to the community? ● From your perspective, how can community understanding and stakeholder engagement in emergency financing mechanisms be improved?

Output 3.1: The vulnerable group needs to be assessed.	● From your knowledge, who are the vulnerable groups identified within the community, and what are their specific needs? ● What challenges and concerns do each vulnerable group face in the context of climate-related disasters? ● How do you believe the community can better address the needs of vulnerable groups in disaster and displacement situations? ● What strategies do you recommend for improving inclusivity and accessibility for vulnerable groups in community programs and initiatives? ● How can the participation of vulnerable groups be improved to ensure their voices are heard, and their needs are met?

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