

Analysis of water, sanitation, and hygiene (WASH) implementation based on GEDSI and climate resilience in Kupang City

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Abstract. This paper provides an overview of WASH implementation, GEDSI, and climate resilience in Kupang City, revealing significant gaps. These gaps include the absence of a monitoring mechanism due to a lack of consensus among local bureaucracies (OPD) concerning community-based total sanitation (STBM) and inadequate budget allocation for monitoring. Additionally, there is a lack of integration between program implementation and existing Urban Sanitation Strategy (SSK) documents, posing an additional challenge to effective STBM execution. Qualitative methodologies, such as key informant interviews and focus group discussions, were employed to engage with key stakeholders, including city government representatives, local leaders, and community youth organizations. The analysis emphasizes Kupang City's efforts in STBM implementation, persistent deficiencies in sanitation management at the urban village level, and ongoing challenges in raising community awareness about proper sanitation practices. Recurring climate vulnerabilities affecting infrastructure and the local population have led to the development of Regional Action Plans for Climate Change Adaptation and Disaster Risk Reduction (RAD API-PRB). Vulnerability during disasters primarily impacts women and children, underscoring the importance of gender equality within households and across all WASH and climate change activities. The absence of youth involvement highlights the need for comprehensive collaboration among stakeholders. Follow-up recommendations align with the SDG 6 Global Acceleration Framework, focusing on data, financing, governance, innovation, capacity building, community participation, and elements related to GEDSI.

1 Introduction

Kupang City, East Nusa Tenggara possesses comprehensive strategic planning documents and programs, such as the Urban Sanitation Strategy (SSK), Environmental Health Risk Assessment (EHRA) study results, the climate urban village program, and Regional Action

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Plans for Climate Change Adaptation and Disaster Risk Reduction (RAD API-PRB). However, SSK plan for 2020–2024 has not been systematically implemented according to the initial plan, necessitating a review and renewed efforts. Furthermore, there is no regional regulation governing sanitation and climate change in Kupang City. Regarding to this condition, this paper aims to enhance health, gender equality, and community well-being through inclusive and sustainable WASH practices. This focus on gender equality is in line with Kohlitz, J., et al., who conducted research in Indonesia and Timor-Leste. These two countries were selected for project implementation due to their exposure to the effects of climate change and documented norms of gender inequality in water management [9].

The extension project in Kupang City (the initial phase of the extension project in 2023–2024) extends beyond improving and sustaining access to sanitation and hygiene services; it actively engages marginalized groups, empowering them to advocate for their sanitation and hygiene-related rights. Furthermore, the project's objective is to explore various approaches related to Gender Equality, Diversity, and Social Inclusion in Water, Sanitation, and Hygiene (GEDSI WASH), as well as climate resilience, aligning with the government's goals in the areas of WASH and climate resilience. This paper provides a detailed explanation the five pillars of community-based total sanitation (STBM) in Kupang City. It also emphasizes the integration of gender equality and social inclusion.

Furthermore, this paper aims to provide an analysis of the initial or existing situation and activities to be implemented in Kupang City (see figure 1). More details to answer several questions, namely: (1) how to access WASH in Kupang and how the Kupang Government realized GEDSI WASH/STBM and climate resilience? (2) What is the role of the community, particularly men and youth, as potential agents of change in asserting their rights to climate-resilient WASH services within households, communities, and institutions in Kupang City? This both questions related with National Planning and Development Agency (“Bappenas” in Bahasa) adjusted standards for improving the quality of drinking water, settlements, and national sanitation according to the Sustainable Development Goals (SDGs) standards from “decent” to “safe” access [13]. Finally, this paper also analysis the findings with SDG 6 Global Acceleration Framework for clean water and sanitation [16] while integrating climate resilience considerations. Since there is a variation of WASH services, access, and problems in different parts of Indonesia, it is important that WASH studies can be conducted locally to give an overview of the local situation, e.g., challenges or problems in a district or provincial levels, and then provide recommendations to solve those problems [13].

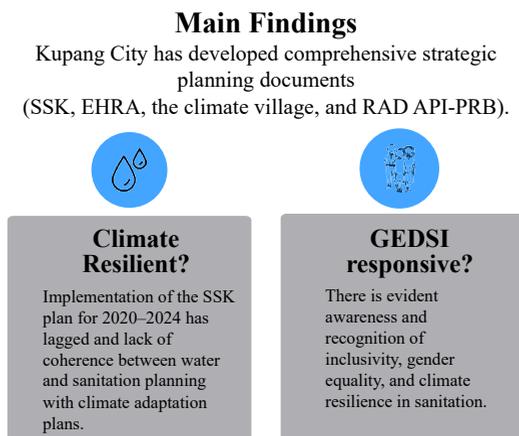


Fig. 1. Main findings climate resilient and GEDSI responsive in Kupang City

2 Study method and process

This study uses a qualitative approach, conducting literature review, key informant interviews, and focus group discussions. During the period from May to August 2023, the team methodically planned and collected data inside Kupang City, conducted analysis, authored the report, and disseminated findings in partnership with local researchers. Secondary data analysis and an extensive literature review were conducted to compile population statistics, assess access to WASH services, review existing policies, and gather other pertinent data. The team conducted interviews with six representatives of the Kupang City Government, specifically from the Agency for Regional Development (Bappeda), Drinking Water and Environmental Sanitation Working Group (Pokja AMPL), District Health Office (DHO), District Public Works and Housing (PUPR) Office, District Housing and Residential Areas (PRKP) Office, District environmental and sanitation services office (DLHK), Regional Board for Disaster Management (BPBD), and two representatives from the Regional Owned Enterprises (BUMD), specifically the clean water service providers, namely Municipal Waterworks (PDAM). Beyond government entities, the team conducted in-depth interviews with various stakeholders, including urban village representatives and community groups actively involved in disaster-related issues, such as Disaster Risk Reduction Forum – Climate Change Adaptation (FPRB-API) Kupang City and community youth organization.

Additionally, two focus group discussions (FGDs) were facilitated. The first FGD involved five young individuals, both male and female, aged between 17 and 25 years, who are actively engaged in WASH and climate resilience issues. This discussion centered on the participation of young people in Kupang City's initiatives. The second FGD gathered five male representatives from diverse backgrounds, including village leaders, religious leaders, waste bank managers, and representatives of community youth organization. This discussion focused on the engagement of men in similar initiatives in WASH and climate resilience issues. Throughout the interview process and the conduct of FGDs, digital audio recording devices were used to capture comprehensive records.

In this study, researchers uphold ethical standards, specifically “Do No Harm” and child protection principles of PLAN Indonesia. Informed consent forms are utilized, offering participants complete study details and the right to refuse or withdraw from interviews and focus group discussions. Sessions occur in locations chosen for safety and comfort, with participants signing a consent sheet to affirm their voluntary participation. The team later transcribed these recordings and used them to create thorough interview notes. The team processes and analyzes interview notes as data findings through a qualitative matrix created based on the scope of the study. A qualitative matrix, aligned with the study's scope, was constructed to facilitate this data analysis process.

3 The Kupang City context: situation of WASH and climate resilience implementation

Kupang City[†] has implemented the STBM program aimed at fostering improved community behaviors and promoting independent adoption of clean and healthy lifestyles [11, 12, 14].

[†] Kupang, the capital of East Nusa Tenggara Province, is situated on Timor Island and covers an area of 180.27 km² on land and 94.79 km² at sea. The city is divided into six districts: Alak (the largest), Maulafa, Oebobo, Kota Raja, Kelapa Lima, and Kota Lama (the smallest). It comprises 51 urban villages and had a total population of 468,913 people in 2022, with 236,182 male and 232,731 female residents. The population density stands at 2,601.17 people per km², with 110,465 Heads of Families (“Kepala Keluarga” in Bahasa) [1, 2, 11, 12]. Kupang City features a

The review document of the Kupang City SSK for the period 2020–2024 articulates the city's vision for sanitation, which is centered on the realization of a clean and healthy urban environment achieved through the development and enhancement of eco-friendly sanitation services. This section describes the implementation of WASH initiatives in Kupang City, provides stakeholder mapping in the WASH sector, examines the prevailing climatic conditions, and assesses the responses of both the government and the community to climate-related hazards.

3.1 WASH implementation situation

The implementation of WASH initiatives in Kupang City is currently facing significant challenges, primarily related to inadequate infrastructure and a lack of climate resilience. The city is still struggling to provide clean and accessible water to its residents. As indicated by the 2019 Kupang City SSK, the city is situated in a hydrologically dry region, leading to water scarcity during dry seasons. Kupang City's water catchment area spans 4,031.13 hectares, encompassing key areas such as Kali, Naioni, Fatukoa Forest Water, and Kolhua Dam [1, 2, 11, 12]. The water crisis in Kupang City can be attributed to several primary factors, including rapid population growth, high population density in urban settlements, inadequate environmental protection practices within communities (e.g., indiscriminate disposal of garbage and open burning of waste), unsafe septic tank construction without concrete bottoms, resulting in domestic wastewater seepage into the ground, unregulated groundwater extraction, and limited financial resources allocated for infrastructure development.

According to the National Socioeconomic Survey (Susenas) data from 2020, access to safe drinking water in NTT reached an achievement rate of 81.13 percent among its residents. This data indicates that approximately eight out of every ten households in NTT have access to reliable drinking water. However, upon examining the water supply situation in Kupang City, it becomes evident that numerous households lack a proper water connection (*Sambungan Rumah – SR* in Bahasa), rendering them unable to receive water from the regional water utility (PDAM). Out of the total number of households, only 1,000 are currently connected to the SR system. Plans are in place to construct an additional 600 SR connections in 2023, with a future goal of providing 13,000 SR connections sourced from the Kali Dendeng Water Supply System. In addition to these challenges, Kupang City also relies heavily on boreholes and dug wells for water sources, with a concerning statistic revealing that approximately 90% of the city's groundwater is contaminated with *E. coli* [11, 12].

The issue of clean water availability has garnered significant attention, particularly considering reports from the BPBD, which highlight the adverse impact of drought conditions on local water sources. BPBD reported, "the drought has led to the drying up of springs like Air Nona Pond, which is slated for diversion to a pig farm. Similarly, the Kali Selam spring has witnessed a decrease in water discharge, and the same trend is observed with the Maulafa spring" (KII BPBD, Kupang, June 5, 2023). Consequently, community

diverse topography, encompassing hills, gentle slopes, lowlands, and coastal areas. Soil contours consist of karst and non-volcanic materials, including river alluvial plains. The highest district, Maulafa, is located at an elevation of 100–350 meters above sea level, while Kota Lama is the lowest, at 0–50 meters above sea level [1, 2, 11, 12]. In terms of demographics, the city's largest age group falls within the 25–29 age range, with a prevalent level of education at the high school and higher education levels. However, Kupang City grapples with a poverty rate of 8.61%, translating to 13,740 households identified as poor by the Social Service in 2019. The city's population is diverse, with a predominantly Christian religious composition and various ethnic groups inhabiting the area. Economically, the majority of Kupang residents earn their livelihoods through fishing, private employment, and State Civil Apparatus positions [1, 2, 11, 12].

members are compelled to incur additional costs to secure clean water, such as utilizing tank systems, which cost Rp. 50,000 (subsidized) or Rp. 70,000 (non-subsidized), in contrast to PDAM charges ranging from Rp. 150,000 to Rp. 200,000 per month. In Indonesia, tanks for storing water in the dry season were a common coping mechanism for helping meet WASH needs when water was scarce [9]. The Kupang City government is unable to provide clean water to all citizens without water pipes or connections to their homes. The total number of houses connected by SR is 1,000. In 2023, an additional 600 SR will be built, and in the future, there are plans for 13,000 SR connections to receive water from the Dendeng River SPAM.

Kupang City is still dealing with sanitation issues, notably regarding household-level sanitation infrastructure such as septic tanks and toilets. Some households are susceptible to faecal contamination, arising from a variety of sources, such as septic tanks or latrines infiltration, with untreated or insufficiently treated sewage effluent [6]. To promote improved community hygiene and foster self-sustained cleanliness and health, Kupang City has implemented the STBM program. This program aims to instill positive behavioral changes within the community, encouraging the adoption of clean and healthy lifestyles and thereby reducing the incidence of environmentally induced illnesses.

According to the 2019 Kupang City SSK, the city made significant strides towards achieving open defecation-free status, as indicated by the findings of the EHRA study conducted in 2019. The results of this study revealed that Kupang City had successfully met its goal of achieving 0% open defecation by the end of 2019. Consequently, the government formally recognized the city's attainment of STBM status. Nevertheless, it is worth noting that Kupang City still faces some sanitation challenges. While open defecation has been effectively eliminated, there remains a prevalence of non-compliant septic tanks (8.91%) that do not adhere to the standards outlined in SNI 2398:2017 [11, 12].

Furthermore, 100% of domestic wastewater generated in residents' households is not being adequately managed or transported. In many cases, these septic tanks remain unemptied, causing them to reach full capacity or leading to direct discharge into the ground. In response to these challenges, the Ministry of Public Works and Public Housing (PUPR) has initiated a septic tank assistance program targeting lower-middle-class households. It is important to note that the installation of a septic tank is a prerequisite for obtaining a building permit (IMB) for structures within Kupang City, including facilities for fecal sludge treatment.

There are already three faecal trucks in operation for transporting domestic wastewater to the Sewage Treatment Plant (STP) but there are still difficulties are encountered when establishing communal sanitation systems due to the type of limestone soil, which hinders water absorption. Kupang city doesn't existing master plan for centralized wastewater treatment. Communal Wastewater Treatment Plant (WWTP) facilities are not yet available too, and the newly built Individual Wastewater Treatment Plant (IPLT) is non-functional [11, 12].

3.2 Stakeholder mapping: responses, understanding, roles and innovation in WASH issue

This sub-section outlines the findings of stakeholder mapping in Kupang City, focusing on sanitation, water, and climate resilience. In the initial phase of research preparation, PLAN Indonesia collaborated with the Kupang government during the Climate Resilience GESI – STBM Kupang City Kick-Off Program. Following the outcomes of this meeting, PLAN offered stakeholder recommendations for interviews, subsequently facilitated by local researchers.

In Kupang City, several legally recognized entities have been established, including the POKJA AMPL, FPRB-API Kupang City, FPRB Kelurahan Liliba, Oesapa, and Tuak Daun Merah (TDM). It's important to note that POKJA API-PRB has not been formed. The key actors in the AMPL Working Group comprise four crucial local bureaucracies (OPD)s: Bappeda, DHO, DLHK, and the PUPR Office, with support from various other agencies. Additionally, the city government is actively involved in managing disaster-resilient villages under BPBD's purview and climate villages overseen by DLHK. Regarding urban sanitation development, Kupang already boasts an established organizational structure delineating the roles of each stakeholder. This organizational framework is documented in the SSK document, encompassing five relevant OPDs. Notably, the study results suggest the potential inclusion of two additional OPDs, namely the PRKP Office and BPBD, into the structure at a later state.

During interviews conducted with Bappeda, a common vision concerning sanitation, water, climate change, and its associated impacts emerged as a significant issue. This lack of consensus was observed among stakeholders both within the city and across the province (KII Bappeda, Kupang, June 5, 2023). This situation has posed challenges in budgeting for the operational costs of the POKJA AMPL, underscoring the necessity of establishing a shared understanding of disaster priorities among all stakeholders (KII Bappeda, Kupang, June 5, 2023). Similarly, DLHK highlighted the absence of initiatives aimed at climate change mitigation and groundwater conservation (KII DLHK, Kupang, June 6, 2023).

Bappeda is encouraged to align the Regional Medium Term Development Plan (RPJMD) Strategic Plan of regional leaders with water and sanitation concerns [3], ensuring that it reflects the city's specific needs and roles of stakeholders (KII PUPR Office, Kupang, June 8, 2023). Moreover, community involvement through religious institutions is recommended for effective community engagement, as these institutions hold significant influence over the local population (KII Bappeda, Kupang, June 5, 2023).

In disaster situations, efficient coordination prevails as village officials swiftly report disaster information to sub-district authorities, which is subsequently forwarded to the city government. Rapid and accurate information dissemination is facilitated through neighborhood unit or community unit (RT/RW) WhatsApp groups and further communicated by urban village ("Kelurahan" in Bahasa). *Kelurahan* representatives confirm this process by emphasizing that "when we received a letter from BPBD, we forwarded it to the RT/RW WhatsApp group and collected needs" (KII FPRB-API, Kupang, June 7, 2023). Additionally, notable cooperation is evident among Bappeda, Communication and Information Office, and urban villages, collectively addressing various strategic concerns. The District Communication and Information Office plays a role in swiftly disseminating information to the public through local television, radio, posters, and social media. However, challenges persist in prompt response and action, primarily stemming from coordination issues, cross-sectoral collaboration, and infrastructure. According to FPRB-API, "The Kupang City Government is currently ill-prepared, lacking a comprehensive, cross-sectoral disaster response infrastructure" (KII FPRB-API, Kupang, June 7, 2023). Greater coordination between government agencies is needed for an effective response to climate change in maintaining inclusive WASH services [10].

3.3 Current climate conditions and climate hazards assessment

The Kupang City Government conducted a Climate Change Vulnerability Assessment (CCVA) from November 2014 to June 2015 with support from UNDP. This assessment, carried out under the Urban Climate Risk Management Program—Safer Communities through Disaster Risk Reduction (UCLIM-SCDRR), aimed to provide insights into Kupang City's vulnerability to climate change. It focused on three key aspects: exposure, sensitivity,

and adaptive capacity. The CCVA generated recommendations for regional policy considerations in Climate Change Adaptation and Resilience (APIK) [14].

Over the past decade, Kupang City has faced climate vulnerabilities, including droughts, storms, and landslides caused by flooding in low-lying areas and coastal erosion. Climate change is likely to lead to increasing risks on the infrastructure used in service provision (Howard, 2010). Droughts result from low rainfall and soil characteristics that inhibit water retention, aggravated by extensive development in water catchment areas. Storms and cyclones frequently impact Kupang City due to its proximity to the sea. Notably, Cyclone Seroja in 2021 had a substantial impact. Landslides are attributed to Kupang's hilly terrain with sparse vegetation, primarily due to limestone soil types. Development along riverbanks and coasts exacerbates this issue, as fragile soil contours are prone to landslides during rainfall and tidal waves. Moreover, the identification of disaster-prone areas in the 2019 SSK document categorizes three types of vulnerable areas: those susceptible to tidal waves and coastal erosion along Kupang City's coastline; landslide-prone areas along the banks of the Liliba, Dendeng, Oesapa, and Merdeka rivers; and flood-prone areas encompassing various villages [4, 5, 7, 11, 12].

Climate change, manifesting through frequent disasters in Kupang City, significantly affects infrastructure, society, and social-economic vulnerability. Infrastructure exposure includes damage to water distribution facilities during droughts, harm to clean water, sanitation, and wells in landslides, and severe house damage, particularly roofing, during storms or cyclones. Community exposure entails challenges faced by residents during droughts and floods, particularly in accessing clean water, and the tragic consequences of Cyclone Seroja. These climate hazards also contribute to social and economic vulnerability, displacing many individuals, causing crop failures for farmers, and preventing fishermen from accessing the sea. In response to these climate hazards, the formation of the Climate Change Adaptation and Disaster Risk Reduction Working Group (POKJA API-PRB) in Kupang City was envisioned to encompass three vital functions: mitigation, preparedness, emergency response, and post-disaster efforts (rehabilitation and reconstruction). The responsibilities were assigned to the BPBD and Social Services for emergency response, and Bappeda for data management and monitoring. Regrettably, the API-PRB Working Group has not been operational due to a lack of consensus among stakeholders, particularly within the city government and its various OPDs. Consequently, OPDs continue to operate within their respective scopes, despite the pressing importance of climate change as it influences community policy priorities.

Bappeda indicated that, despite several years passing, there hasn't been a comprehensive master plan to address climate impact, with efforts primarily programmatic in nature. Nonetheless, practical initiatives, such as conservation efforts that involve creating infiltration holes or water planting programs in houses, especially those championed by religious institutions, are already underway (KII Bappeda, Kupang, June 5, 2023). For example, in Oesapa, one of the climate villages, efforts to collect and filter rainwater for consumption have been implemented (KII DLHK, Kupang, June 6, 2023). Another adaptation concept is turning a section of the city into a "lung" in *Kelurahan* Kelapa Lima, aimed at enhancing water absorption and groundwater formation (KII Karang Taruna Kota, Kupang, June 8, 2023).

The primary challenge in mitigating climate change threats, as pointed out by FPRB-API, is the lack of cross-sectoral coordination. Key documents like the Regional Action Plan for Climate Change Adaptation (RAD) have not been prioritized, especially in budget allocations. Community programs aimed at mitigation haven't been adequately consolidated towards a shared goal, and there is a dire need for improved communication on strategic issues, which currently remains limited (KII FPRB-API, Kupang, June 8, 2023). Climate change adaptation is inherently a socio-political act. WASH interventions should aim to gain

the perspectives of diverse groups to ensure that actions taken by communities and government reflect the needs and concerns of all people [9].

4 Identifying responses to gender equality and social inclusion (GEDSI) and community participation on WASH and climate resilience

Effective climate change adaptation programs must consider the needs of vulnerable community groups, including fishermen, farmers, the elderly, women, children, and people with disabilities. This chapter explains the situation of GEDSI responses in Kupang City (see figure 2). Women and children stand out as particularly vulnerable when disaster crises strike. However, Women have significant knowledge about WASH needs and systems that can be drawn on to design and implement effective and sustainable WASH [15]. While gender equality is an essential aspect of households, its full implementation faces challenges due to persisting religious and cultural norms. Addressing these barriers necessitates community education and support, especially for male groups, such as religious and traditional leaders.

Vulnerable groups, particularly those with disabilities, face heightened vulnerability in urban areas due to limited accessibility and inadequate infrastructure. Limited physical accessibility to WASH services was identified as a barrier for people with disabilities which could be exacerbated by climate change impacts [10]. Many facilities are not yet accommodating to their needs, exacerbating their vulnerability. This involvement primarily focuses on program socialization, with limited participation from the inception of project ideas to input, implementation, and monitoring and evaluation discussions. Women and people with disabilities had fewer opportunities to influence community decisions about WASH that might affect how they personally experience effects of climate change [9]. For example, in Tofa Village and Maulafa Village, there are 46 blind families encountering accessibility challenges. Presently, they have limited active involvement and are primarily included in meetings within urban villages. Clean water accessibility is also an independent effort, with residents drawing water from Tofa springs, nearby dug wells, or utilizing reservoirs (KII Lurah Maulafa, Kupang, June 8, 2023).

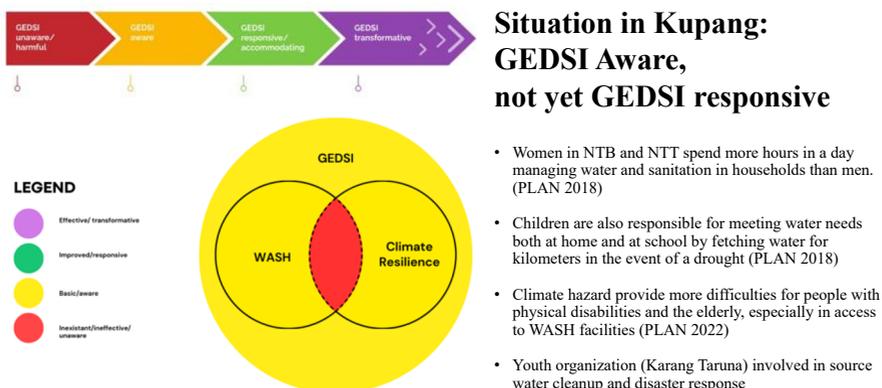


Fig. 2. Situation of GEDSI responses in Kupang City

Regarding disaster management, BPBD highlighted the implementation of disaster management bylaws, giving special attention to women, children, and youth throughout the pre-disaster, disaster, and post-disaster phases. BPBD emphasized prioritizing assistance and

necessities, including family kits containing menstrual hygiene products and the provision of clean water tanks (KII BPBD, Kupang, June 5, 2023).

The DHO pointed out that although the adverse effects of poor water quality, such as stunting, are recognized, women, young people, and pregnant women have not been actively involved in policy formulation discussions or meetings (KII DHO, Kupang, June 6, 2023). Furthermore, the city's community youth organization indicated that no institution has provided capacity-building initiatives related to the environment or climate change. To address these issues, the government should institute measures to ensure the active participation of women in urban villages' Musrenbang ("Musyawarah Perencanaan Pembangunan" in Bahasa, or development planning meetings). Prioritizing the role of women, especially mothers, in fostering environmentally responsible behaviors starting at home and within families is considered crucial. Additionally, efforts should focus on creating a disability-friendly Kupang City, which may include providing wheelchairs and enhancing disability-friendly facilities, such as bath, wash, toilet (MCK) facilities in the Oebobo Market, overseen by the PUPR Office. To engage the youth effectively, the government should compile data on the potential and interests of young people, communities, and organizations within Kupang City.

4.1 Youth Participation and Acceptance

In this sub-section, it explains how young individuals in Kupang have experienced the effects of current climate change first-hand. They note reduced water flow, increasingly scorching temperatures, and economic repercussions such as crop failures for farmers. Concerning sanitation, particularly waste management, young people in FGD acknowledge the persistence of waste issues despite numerous "clean-up" initiatives. The challenge lies in altering behaviors related to waste disposal, sorting, and management due to insufficient awareness of the broader hazards associated with improper waste handling and littering. Moreover, the water management program still faces challenges, as many individuals continue to grapple with inadequate access to clean water and limited services from the PDAM.

The involvement of young people in sanitation, water, and climate resilience issues in Kupang City is currently limited due to low awareness. Many young individuals perceive waste management as a dirty and unprestigious task. Nonetheless, certain groups of young people are actively engaged in addressing these challenges. They participate in initiatives such as: (1) collaborating with healthcare facilities (hospitals, health centers, and clinics) to improve liquid waste treatment methods and reduce the discharge of medical waste into the environment; (2) organizing youth communities dedicated to coastal waste management, often collaborating with existing waste banks; and (3) undertaking research and practical efforts to process household waste, thereby minimizing its contribution to landfills.

To involve the youth of Kupang in climate change and sustainability issues, several effective strategies have been identified by youth focus group participants. These strategies include: (1) engaging young influencers or role models who have made substantial contributions to these issues, especially in the context of climate change; (2) establishing awards or recognition programs that celebrate and appreciate the efforts of young individuals working on climate change; (3) ongoing socialization and education through various channels, including social media and face-to-face interactions; and (4) actively involving young people in the planning and implementation of programs, allowing them to co-design initiatives and activities. To support these efforts, youth participants expressed the need for climate resilience training facilitated by the POKJA AMPL in collaboration with NGOs focused on related issues. They also emphasized the importance of capacity building through government-funded partnerships with NGOs. Furthermore, the youth in Kupang hope for a

reduction in sectoral barriers within the government's roles and responsibilities. They aspire to see more inclusive development planning that engages various stakeholders. They also believe that continued collaboration between the government and the community is essential for success. Lastly, creating spaces for innovation, collaboration, and communication, such as co-working spaces, financial support, promotion, and regulatory frameworks, is vital to empower and mobilize younger generations to take an active role in addressing climate change and sustainability challenges.

4.2 Men's Involvement in Sanitation and Climate Resilience Issues

In the context of men's participation in climate resilience efforts in Kupang City, participants in FGD acknowledged the importance of both women and men being actively engaged. However, traditional gender roles in the region continue to limit women's leadership roles. Women were less likely to attend community meetings on WASH than men, either because men were culturally prioritized to be invited as the household heads, women were too burdened with domestic responsibilities to attend, or if women had attended before they felt their voices were not valued [9]. Addressing this challenge requires negotiations to redefine gender roles and effective socialization through circulars and policy initiatives. As climate change persists and the population grows, urbanization and land conversion will continue. To navigate these changes, there is a pressing need to raise awareness, especially among men, regarding their involvement in traditionally female-dominated areas such as sanitation and addressing the adverse effects of climate change. Climate change brings about a range of consequences, including intensified disasters such as heavy rainfall and water scarcity during the dry season, necessitating increased spending on clean water services. Households, especially in areas with limited clean water access, feel these impacts acutely. Women's traditional roles involved managing water for their households. This meant women bore a greater burden of response to climate change impacts on WASH in terms of collection, treatment and storage of water [10]. Women, who typically require more water than men for personal hygiene and household needs, are particularly attentive to water availability issues.

The role of men in environmental initiatives, such as waste management, remains limited compared to women's involvement. However, the roles of men and women can complement each other in various aspects of home maintenance and environmental protection. Achieving gender equality in engagement is crucial, allowing women to take on leadership roles and contribute their expertise. Furthermore, more quitable WASH outcomes may occur when all community members are empowered and included in decision-making. This is particularly important in dealing with climate change impacts, which have the potential to exacerbate existing inequalities [10]. Promoting gender equality ensures that both men and women have equal access to climate change mitigation efforts. At the household level, tasks related to water and sanitation exhibit little difference in the division of labor between men and women. While some responsibilities may be traditionally assigned, both genders can effectively perform household chores. This practice reflects the collaborative roles of men and women in maintaining their homes.

5 Conclusion

In summary, this paper provided an overview of the initial conditions in Kupang City, covering WASH implementation, GEDSI, climate resilience, and community participation and acceptance related to sanitation and climate resilience. It also included a detailed analysis of these conditions, emphasizing the potential and challenges within each aspect. These

findings are aligned with the SDG 6 Global Acceleration Framework for clean water and sanitation.

The findings reveal that Kupang City has developed comprehensive strategic planning documents and programs, such as the SSK, EHRA study outcomes, the climate village program, and RAD API-PRB. However, discussions with Bappeda indicate that the implementation of the SSK plan for 2020–2024 has deviated from the original plan, warranting a review and renewed efforts. Notably, there is a lack of regional regulations governing sanitation and climate change in the city. Regarding GEDSI and community participation, there is evident awareness and recognition of inclusivity, gender equality, and climate resilience in sanitation matters. Therefore, the active participation of inclusion groups, particularly women, youth and individuals with disabilities, is deemed vital at every stage of program development, from planning to monitoring and evaluation.

The analysis of existing conditions presented in this paper spans components related to SDG 6, including data and information, financing, governance, innovation, capacity building, community participation, and additional factors related to GEDSI [16]. The study offers recommendations aligned with the SDG 6 Global Acceleration Framework and GEDSI for clean water, waste management, and hygiene. In summary, general recommendations for each framework component include: strengthening data and information dissemination, especially during disaster management, rationalizing budgets to meet the long-term needs of climate-resilient sanitation, delegating authority and responsibility to the AMPL Working Group for achieving SSK targets, actively engaging religious institutions, youth groups, and village institutions in disseminating SSK achievements, actively involving youth and individuals with disabilities in program planning, implementation, and monitoring and evaluation, facilitating and creating spaces for women to express their views in public meetings, *Musrenbang* (village development planning meetings), and leadership opportunities in related activities and programs. Moreover, in the future, it will be imperative to measure and analyze the evaluation of WASH initiatives in Kupang City, ensuring a more extended longitudinal perspective, with a specific focus on sustainability and impact.

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