RESEARCH ARTICLE OPEN ACCESS

INTEGRATION OF PROGRAMS FOR RESILIENCE: STRENGTHENING MULTI-HAZARD PREPAREDNESS IN TAGAYTAY CITY

Kristine Joy V Moya*, Nickie Boy A. Manalo**
*(College of Accountancy, Business, Economics, and International Hospitality Management, Batangas State University – The National Engineering University, Batangas City, Philippines
Email: Kjgvillanueva@ymail.com)
** (College of Accountancy, Business, Economics, and International Hospitality Management, Batangas State University – The National Engineering University, Batangas City, Philippines
Email: nickiemanalo1208@gmail.com)

----------**********----------

Abstract:

Tagaytay City faces multiple natural hazards such as landslides, typhoons, earthquakes, and volcanic eruptions due to its steep topography and proximity to the West Valley Fault and Taal Volcano. This action plan proposes an integrated, community-based approach to disaster risk management that aligns local programs with the four DRRM thematic areas: Prevention and Mitigation, Preparedness, Response, and Rehabilitation and Recovery. It is anchored on RA 10121 and emphasizes multi-sectoral coordination, community engagement, and capacity-building to strengthen resilience, especially among vulnerable populations.

Keywords: **Multi-Hazard Preparedness, Tagaytay City, Landslide, Slope Stabilization**

----------**********----------

1. BACKGROUND

Tagaytay City, while known for its scenic landscapes and cool climate, is geographically situated in a high-risk area vulnerable to a range of natural hazards such as landslides, typhoons, earthquakes, and volcanic eruptions. These threats are compounded by the city's steep terrain, rapid urbanization, and proximity to major fault lines and volcanic systems. Recognizing the urgent need for a comprehensive and community-based approach to disaster risk management, this action plan aims to strengthen Tagaytay City's resilience by integrating existing programs and aligning them with national disaster frameworks and local development priorities.

1.1. Introduction

The Philippines' geographical location places it at high risk for natural disasters. Tagaytay City, being along the ridge of Taal Volcano, is particularly exposed to landslides, ground shaking, typhoons, and volcanic eruptions. In July 2022, a deadly landslide in Barangay Kaybagal Central emphasized the city's susceptibility to cascading hazards. With over 40% of its land area featuring steep slopes, the city's urbanization trends intensify risks. The action plan aims to integrate DRRM programs to improve community preparedness and reduce disaster risks.

1.2. Background of the Plan

Tagaytay City's location along the Taal Volcano ridge and near the West Valley Fault makes it highly vulnerable to natural hazards such as earthquakes, volcanic eruptions, typhoons, and landslides. Its elevated and sloped terrain further increases the risk of soil erosion and ground instability. As a popular tourist destination and rapidly urbanizing area, the city faces added pressure on land use and infrastructure. This action plan was developed to integrate disaster risk reduction initiatives across all 34 barangays, strengthen coordination among stakeholders, and

implement community-based strategies to enhance preparedness and resilience.

1.3. Multi-hazard Scenario

Tagaytay City regularly experiences intense rainfall, especially during typhoons and monsoon seasons, which saturates the soil and weakens slope stability often triggering rain-induced landslides. Its steep topography, erodible soil, and deforested areas increase susceptibility to cascading hazards. Historical events, such as landslides in 2022 and 2024, have highlighted the city's vulnerability and the urgent need for slope stabilization, hazard mapping, and strict land-use regulations. The combined threat of landslides, ground shaking, volcanic activity, and extreme weather underscores the need for integrated and proactive disaster risk management.

1.4. Scope and limitation of the Plan

The plan focuses on enhancing disaster resilience in all 34 barangays of Tagaytay City by integrating programs under the four DRRM thematic areas: Prevention and Mitigation, Preparedness, Response, and Rehabilitation and Recovery. It promotes coordination among LGUs, barangays, responders, and communities to improve awareness, early warning systems, and emergency response.

However, limitations include resource constraints, varying community engagement levels, outdated hazard data, overlapping policies, and the influence of external socio-political and environmental factors that may affect implementation and sustainability.

1.5. Significance of the Plan

This action plan is vital in strengthening Tagaytay City's disaster resilience by unifying existing DRRM efforts across sectors and communities. It ensures efficient resource use, reduces redundancy, and promotes coordinated emergency preparedness and response. By emphasizing community engagement and capacity-building, the plan empowers residents to actively participate in risk reduction, supporting both immediate safety and long-term sustainable development.

1.6. Assumptions of the Plan

The plan assumes that Tagaytay City will continue to face multiple natural hazards due to its geography. It presumes that existing DRRM programs can be effectively integrated through active collaboration among LGUs, barangays, responders, and communities. It also assumes the availability of sufficient resources, sustained political and policy support, stakeholder cooperation, and community participation. Environmental stability, adherence to regulations, and the timely implementation of activities are also key underlying assumptions.

2. SITUATIONAL ANALYSIS

Understanding the global and local context of disaster risks is essential in developing an effective and responsive action plan. This situational analysis examines both international and Philippine experiences with multi-hazard events particularly rain-induced landslides highlighting the contributing factors, impacts, and lessons learned. By assessing these scenarios, the analysis provides a foundation for identifying vulnerabilities and shaping appropriate strategies for Tagaytay City's disaster risk reduction and management efforts.

2.1. Global Context

Global case studies (e.g., Venezuela 1999, Sierra Leone 2017) show the devastating impacts of rainfall-induced landslides. International responses include Japan's early warning systems and Sierra Leone's community training. Climate change exacerbates landslide risks through increased extreme rainfall.

2.2. Local Context

The Philippines experiences frequent rainfall-induced landslides. Recent typhoons Glenda (2014), Gaemi (2024), and Aghon (2024) caused fatalities and infrastructure damage. Local gaps persist in infrastructure resilience and community-based preparedness despite national efforts (e.g., PHIVOLCS warnings, slope protection).

2.3. Research Design

The study used a combination of descriptive and exploratory research methods to assess Tagaytay City's multi-hazard risks and disaster preparedness. The descriptive approach provided measurable data on community vulnerabilities and existing DRRM practices, while the exploratory approach identified gaps, challenges, and potential improvements. Together, these methods enabled a comprehensive understanding of disaster risks and informed the development of targeted, community-based strategies for resilience.

2.4. Respondents

The study involved 30 respondents from various sectors to ensure diverse perspectives on disaster preparedness in Tagaytay City. These included residents from selected barangays, elected officials, personnel from the City Engineering and Planning Offices, emergency responders from the BFP and TCDRRMO, and college students. The respondents were selected using purposive sampling to capture insights from both community members and technical experts. This diverse representation helped identify key vulnerabilities, strengths, and areas for improvement in the city's disaster risk reduction efforts.

2.5. Data Gathering Instrument

The primary tool used for data collection was a structured survey questionnaire designed to assess respondents' awareness, preparedness, and perceptions of disaster risks in Tagaytay City. It included demographic questions and Likert scale items to measure agreement on key DRRM issues. The questionnaire was clear and accessible to respondents from various backgrounds, allowing for both quantitative and qualitative analysis. The collected data served as the foundation for developing an evidence-based, community-focused disaster action plan.

2.6. Data Gathering Procedure

The study used a structured and systematic approach to collect data through surveys, interviews, and focus group discussions. Respondents were selected using purposive sampling to represent key sectors, including residents, officials, planners, responders, and students. Surveys were administered both in-person and digitally, with pre-testing conducted to ensure clarity. Ethical standards were observed, including informed consent and confidentiality. Data were analyzed using statistical tools and thematic coding, with cross-verification from secondary sources to ensure accuracy and reliability. The findings guided the formulation of the action plan.

2.7. Result of the Survey

The survey results showed that Tagaytay City residents have a high level of awareness and preparedness for natural hazards such as landslides, typhoons, and earthquakes. Respondents strongly agreed on the importance of early warning systems, household disaster plans, and community-based preparedness activities. They expressed trust in local government response efforts and supported stricter land-use regulations and increased DRRM funding. However, gaps were noted in risk communication, infrastructure adequacy, and inclusive participation, especially among vulnerable sectors. Overall, the data emphasized the need for continuous community engagement and investment in disaster mitigation.

Key Area	Findings
Respondent Groups	Residents, elected officials, zzemergency responders, and students
Hazard Awareness	High awareness of disaster risks (Mean: 3.47)
Perceived Threats	Landslides and typhoons identified as primary threats (Mean: 3.54)
Trust in DRRM Systems	Strong confidence in local DRRM plans and response (Mean: 3.63)
Training and Communication	Identified need for better communication and more frequent training
Community Priorities	Support for slope stabilization, stricter zoning, and more DRRM funding
Barangay-Level Insights	Variations in risk communication and infrastructure access across barangays

2.7.1. SWOC Analysis

To effectively enhance disaster resilience in Tagaytay City, it is essential to evaluate the internal and external factors influencing the current state of disaster risk reduction and management (DRRM). This SWOC analysis identifies the city's Strengths, Weaknesses, Opportunities, and Challenges in implementing community-based DRRM strategies. By understanding these key elements, stakeholders can build on existing capacities, address gaps, and develop informed, sustainable interventions that strengthen preparedness, response, and recovery efforts across all barangays.

Strengths: Tagaytay City has a strong foundation in disaster risk reduction and management (DRRM). The City Disaster Risk Reduction and Management Office (CDRRMO) is well-established and supported by local ordinances that institutionalize disaster preparedness. Barangay DRRM Councils are active and equipped with trained personnel and basic emergency tools. The city also utilizes GIS and Climate and Disaster Risk Assessment (CDRA) tools to guide hazard mapping and planning. Its Incident Command System (ICS) ensures coordinated emergency response, while early warning systems and multi-platform communication channels allow timely dissemination of alerts to the public.

Weaknesses: Despite its strengths, the city faces several internal limitations. Delays in delivering warnings, especially in remote barangays, reduce the effectiveness of early response. Around 35% of barangays lack essential emergency response equipment, which weakens local preparedness. Evacuation centers have limited capacity, and logistical issues often affect the swift distribution of relief goods. Budget limitations hinder the implementation of long-term resilience projects. Additionally, some local responders lack sufficient technical knowledge to operate advanced tools like GIS and automated monitoring systems.

Opportunities: There are valuable opportunities to further enhance Tagaytay's DRRM initiatives. The city can strengthen partnerships with NGOs, the private sector, and academic institutions to improve resources, training, and knowledge-sharing. Introducing smart technologies—such as mobile applications and AI-based hazard monitoring—can modernize preparedness strategies. Updating policies to integrate climate adaptation and enforcing stricter land-use zoning can reduce risk. Moreover, accessing national and international funding sources presents an opportunity to support infrastructure upgrades and disaster mitigation projects.

Challenges: Tagaytay City must address several ongoing challenges. Rapid urbanization, deforestation, and tourism-driven development have increased the risk of flooding and landslides. Climate change continues to intensify typhoons, heavy rainfall, and other natural hazards. Inclusive participation remains a challenge, particularly among persons with disabilities, senior citizens, and other vulnerable sectors. Sustaining DRRM programs long-term can be difficult due to shifting political priorities and limited funding. Additionally, many critical infrastructures such as roads and drainage systems still lack the resilience needed to withstand future disasters.

2.7.2. PESTEL Analysis

A comprehensive understanding of the external environment is crucial for developing effective and sustainable disaster risk reduction and management strategies. This PESTEL analysis examines the Political, Economic, Social, Technological, Environmental, and Legal factors that influence the implementation of DRRM initiatives in Tagaytay City. By identifying these macro-level influences, the analysis helps inform strategic planning, policy formulation, and program implementation to ensure the city's resilience against multiple hazards.

Political: Tagaytay City benefits from strong political support for disaster risk reduction, with the implementation of national laws such as RA 10121 and local ordinances institutionalizing DRRM efforts. The establishment of the CDRRMO and active barangay DRRM councils reflect the local government's commitment to building resilience. However, the consistency of political will and

leadership across different administrations remains essential for sustaining long-term DRRM initiatives.

Economic: While Tagaytay allocates a portion of its local budget through the Local Disaster Risk Reduction and Management Fund (LDRRMF), financial limitations still affect the scale and continuity of some DRRM projects. Funding is often sufficient for basic preparedness but falls short for large-scale infrastructure, capacity-building, and long-term resilience investments. Accessing additional funding from national agencies, private partners, and international sources is vital for expanding the city's DRRM capacity.

Social: The community demonstrates high levels of awareness and willingness to participate in disaster preparedness activities. However, disparities in access to information and resources exist, particularly among vulnerable groups such as the elderly, persons with disabilities, and low-income households. Strengthening inclusive, community-based engagement is necessary to ensure that all sectors are equally protected and empowered in DRRM efforts.

Technological: Tagaytay City has adopted technologies such as GIS, automated weather stations, and early warning systems to support hazard monitoring and planning. These tools enhance risk analysis and emergency response. However, limited technical skills at the barangay level and among some responders hinder full utilization of these technologies. Expanding digital literacy and providing technical training are key to maximizing their benefits.

Environmental: The city's steep terrain, proximity to active fault lines and volcanoes, and increasing urban development heighten environmental risks. Deforestation, soil erosion, and unregulated construction in hazard-prone areas further contribute to vulnerability. Environmental conservation, enforcement of no-build zones, and slope protection measures are crucial to maintaining ecological balance and reducing disaster risks.

Legal: Tagaytay's DRRM framework is anchored in national legislation like RA 10121 and strengthened by local ordinances specific to disaster management, youth involvement, and evacuation protocols. However, enforcement remains a challenge, particularly in land-use regulations and zoning compliance. Strengthening monitoring mechanisms and ensuring accountability can enhance legal effectiveness and support safer urban development.

3. GOALS AND OBSJECTIVE PER THEMATIC AREA

The following summary highlights the key goals and objectives outlined in Chapter III of the action plan, which are structured according to the four thematic areas of disaster risk reduction and management (DRRM). Each goal reflects Tagaytay City's commitment to reducing disaster risks and enhancing resilience, while the objectives provide clear, actionable steps to be implemented within defined timelines. These strategies are grounded in data gathered from surveys, situational analysis, and the SWOC framework to ensure a targeted and evidence-based approach.

3.1. Thematic Area 1: Disaster Prevention and Mitigation:

3.1.1. Goal 1: Reduce disaster vulnerability in Tagaytay City by enhancing land-use policies, investing in critical infrastructure, and ensuring informed urban planning.

Objectives:

- **1.1:** To strictly enforce land-use regulations through quarterly inspections in identified landslide-prone areas, successfully targeting zero unauthorized constructions by December 2026 (Survey Result, Table 9, Page 58).

- **1.2:** To increase annual funding allocation for slope stabilization and flood control infrastructure projects by 30% beginning in 2026, prioritizing barangays identified as high-risk (Survey Result, Table 9, Page 59).

- **1.3:** To mainstream Climate and Disaster Risk Assessment (CDRA) findings into local development and zoning strategies by December 2026, utilizing GIS technology for precise risk mapping (SWOC, Strengths, Page 62).

3.2. Thematic Area 2: Disaster Preparedness

3.2.1. Goal 2: Enhance disaster preparedness capabilities in Tagaytay City through improved community education, increased stakeholder collaboration, and regular emergency preparedness activities.

Objectives:

- **2.1:** To facilitate quarterly capacity-building workshops and simulated disaster response exercises with TCDRRMO, BFP, and barangay representatives, starting January 2026, boosting coordination and effectiveness (SWOC, Strengths, Page 63).

- **2.2:** To execute bi-annual multi-hazard drills across all barangays, achieving a minimum 90% community participation rate by November 2026, informed by results from regular simulation activities (SWOC, Strengths, Page 63).

3.3. Thematic Area 3: Disaster Response

3.3.1. Goal 3: Streamline disaster response efforts, ensuring rapid and efficient delivery of assistance through robust resource management and enhanced coordination frameworks.

Objectives:

- **3.1:** To implement an integrated logistics management system by July 2026, ensuring relief distribution within 24 hours post-disaster, addressing previously identified logistical inefficiencies (SWOC, Weaknesses, Page 67).

- **3.2:** To expand the capacity of three existing permanent evacuation centers from 500 to 1000 persons each by December 2026, mitigating current evacuation limitations (SWOC, Strengths, Table 12, Page 64).

3.4. Thematic Area 4: Disaster Rehabilitation and Recovery

3.4.1. Goal 4: Ensure swift and comprehensive post-disaster recovery and sustainable livelihood restoration for affected communities in Tagaytay City.

Objectives:

- **4.1:** To create detailed infrastructure rehabilitation plans within three months following disasters, focusing on infrastructure identified as vulnerable in the SWOC analysis (SWOC, Challenges, Page 70).

4. ACTION PLAN

This section presents a consolidated summary of the action plan designed to enhance disaster resilience in Tagaytay City. Aligned with the four thematic areas of disaster risk reduction and management (DRRM) Disaster Prevention and Mitigation, Disaster Preparedness, Disaster Response, and Disaster Rehabilitation and Recovery the action plan outlines clear goals, measurable objectives, and targeted programs, projects, and activities (PPAs). These interventions are informed by situational analysis, survey results, and the SWOC and PESTEL assessments, ensuring that each initiative addresses identified vulnerabilities, strengthens local capacities, and promotes a safer, more resilient community.

4.1. Thematic Area 1: Disaster Prevention and Mitigation:

4.1.1. Goal 1: Reduce disaster vulnerability through land-use enforcement, infrastructure investment, and informed urban planning.

- **Objective 1.1: Strictly enforce land-use regulations in landslide-prone areas. (PPA**

1.1.1 – 1.1.2): The strict enforcement of land-use regulations is intended to eliminate unauthorized construction in landslide-prone areas, thereby reducing disaster risks in vulnerable communities. This initiative includes the conduct of quarterly inspections, which are expected to directly benefit approximately 2,000 households residing in identified hazard zones. To strengthen regulatory efforts, a GIS-based land monitoring system will be implemented to enable real-time tracking and oversight. Regular submission of land-use enforcement reports and the operational use of GIS monitoring tools will serve as key outputs to ensure consistent compliance and informed urban planning.

- **Objective 1.2: Increase annual funding for slope stabilization and flood control projects by 30%. (PPA 1.2.1):** Increasing funding by 30% for slope stabilization projects is a strategic measure to protect vulnerable communities from the impacts of landslides and floods. This initiative targets high-risk barangays, where an estimated 3,500 residents stand to benefit from the construction of retaining walls, slope netting, and improved drainage systems. The key output of this intervention will be the completion of slope protection infrastructure in the identified areas, significantly enhancing community safety and resilience against geohazards.

- **Objective 1.3: Mainstream CDRA findings into land use and zoning (PPA 1.3.1 – 1.3.2):** Integrating Climate and Disaster Risk Assessment (CDRA) findings into zoning and planning processes promotes risk-sensitive land-use decision-making in Tagaytay City. This initiative ensures that the updated Comprehensive Land Use Plan (CLUP) and zoning ordinances incorporate barangay-level hazard maps generated through GIS technology. To support implementation, approximately 20 local planners and barangay officials will undergo training on the use and interpretation of these tools. The key outputs include updated land-use plans, CDRA-integrated policies, and comprehensive risk maps covering all 34 barangays, thereby enhancing informed urban development and disaster preparedness.

4.2. Thematic Area 2: Disaster Preparedness

4.2.2. Goal 2: Enhance preparedness through education, collaboration, and simulations.

- **Objective 2.1: Facilitate quarterly capacity-building workshops and simulations (PPA 2.1.1 – 2.1.2):** Capacity-building workshops and simulation exercises aim to strengthen coordination and enhance preparedness among key stakeholders in disaster response. A total of 102 representatives from the TCDRRMO, BFP, PNP, and all 34 barangays will be trained on standardized emergency protocols to ensure a unified approach during emergencies. Additionally, two simulation exercises will be conducted to evaluate existing coordination mechanisms and identify areas for improvement. The key outputs of this initiative include trained responders, comprehensive evaluation reports, and revised coordination protocols that reflect lessons learned and best practices.

- **Objective 2.2: Execute bi-annual multi-hazard drills with 90% community participation (PPA 2.2.1 – 2.2.2):** Community-wide drills and information campaigns are designed to ensure that households are well-informed and prepared to respond effectively during emergencies. These initiatives aim for at least 90% participation from approximately 2,100 households in each barangay, promoting widespread awareness and readiness. In addition, public information videos on hazard response will be disseminated to reach over 5,000 individuals in schools, transport terminals, and residential areas. Key outputs include the successful conduct of emergency drills, documented evaluations of community response, and the production of

localized instructional videos tailored to specific hazards.

4.3. Thematic Area 3: Disaster Response

4.3.1. Goal 3: Streamline emergency response through logistics and facility improvement.

- **Objective 3.1: Implement an Integrated Logistics Management Information System (PPA 3.1.1 – 3.2.1):** The implementation of an Integrated Logistics Management Information System (ILMIS) will streamline and enhance the efficiency of relief operations in post-disaster scenarios. This system will enable 15 logistics personnel from key offices to manage and track relief goods in real time, ensuring timely delivery to affected communities ideally within 24 hours after a disaster strikes. The key outputs of this initiative include a fully functional ILMIS, trained system users, and regular performance reports that assess the system's effectiveness in supporting rapid and coordinated relief efforts.

- **Objective 3.2: Expand the capacity of 3 permanent evacuation centers (PPA 3.2.1):** Upgrading evacuation centers is a crucial step in providing safe and adequate shelter for displaced populations during disasters. This initiative will increase the capacity of three existing evacuation centers from 500 to 1,000 individuals each, enabling them to collectively accommodate up to 1,500 evacuees. The key output will be the renovation and full equipping of these facilities to meet established safety and humanitarian standards, thereby improving the overall emergency shelter system in the city.

4.4. Thematic Area 4: Disaster Rehabilitation and Recovery

4.4.1. Goal 4: Ensure swift and comprehensive recovery after disasters.

- **Objective 4.1: Create infrastructure rehabilitation plans within three months post-disaster (PPA 4.1.1 – 4.1.2):** Post-disaster recovery efforts will be anchored on rapid assessments and comprehensive planning to ensure timely and effective rehabilitation. Infrastructure assessment teams will be mobilized within two weeks after a disaster to evaluate damages and address the immediate needs of approximately 5,000 affected residents. Within three months, detailed rehabilitation plans will be completed to guide phased recovery efforts across all impacted barangays. Key outputs include rapid damage assessment reports and structured infrastructure recovery plans that support sustainable rebuilding and community resilience.

5. MONITORING AND EVALUATION

The Monitoring and Evaluation (M&E) framework is a critical component of Tagaytay City's Disaster Risk Reduction and Management (DRRM) action plan. It provides a systematic process for tracking the implementation, progress, and effectiveness of programs, projects, and activities (PPAs) across all thematic areas. By establishing clear indicators, targets, and responsible agencies, the M&E system ensures accountability and facilitates data-driven decision-making. This summary highlights the key monitoring and evaluation measures designed to assess outcomes, identify challenges, and guide continuous improvement in building disaster resilience throughout the city.

5.1. Thematic Area 1: Disaster Prevention and Mitigation:

5.1.1. PPA 1.1.1: Quarterly Land-Use Compliance Inspections: This activity aims to enforce stricter land-use policies in landslide-prone barangays through regular quarterly inspections. The goal is to eliminate unauthorized constructions by December 2026. By increasing inspection frequency from semi-annual to quarterly, this initiative promotes compliance, reduces risks of construction-related disasters, and ensures safer settlement practices in hazard-prone areas.

5.1.2. PPA 1.1.2: Deployment of GIS-Based Land Monitoring System: This PPA introduces a GIS-powered monitoring platform for real-time land surveillance across 34 barangays. It seeks to enhance planning precision and regulatory enforcement by training 15 regulatory officers to use the system. This technological shift ensures early detection of violations and supports more responsive urban management.

5.1.3. PPA 1.2.1: Completed Slope Stabilization in Selected Barangays: Focusing on infrastructure mitigation, this project increases funding for slope stabilization and flood control by 30%, prioritizing high-risk areas. It addresses limited previous coverage by reinforcing vulnerable slopes, reducing landslide incidents, and protecting approximately 3,500 residents with structural interventions like retaining walls and improved drainage systems.

5.1.4. PPA 1.3.1: Mainstreaming CDRA Findings into Land Use and Zoning Policy: To improve land-use planning, this project integrates Climate and Disaster Risk Assessment (CDRA) results into the city's Comprehensive Land Use Plan (CLUP) and zoning ordinance. Covering all 34 barangays, it ensures that updated risk maps inform planning decisions and promote disaster-resilient urban development.

5.1.5. PPA 1.3.2: Use of GIS Tools for CDRA Risk Mapping: This initiative complements CDRA mainstreaming by training 20 local planners and officials to use GIS for barangay-level risk mapping. The activity strengthens data-driven planning processes, enabling the production of accurate, localized hazard maps that inform zoning and development decisions.

5.2. Thematic Area 2: Disaster Preparedness

5.2.1. PPA 2.1.1: Inter-Agency Emergency Coordination Workshops: This project aims to improve disaster preparedness through quarterly workshops with TCDRRMO, BFP, PNP, and barangay representatives. The focus is on clarifying roles, refining communication protocols, and enhancing coordination mechanisms. A total of 102 participants will be trained, ensuring more cohesive and responsive emergency actions.

5.2.2. PPA 2.1.2: Simulation-Based Response Exercises: To test and strengthen actual emergency coordination, this PPA organizes simulation drills in Q2 and Q4 of 2026. These exercises replicate disaster scenarios to assess the effectiveness of communication and response strategies among local responders and agencies.

5.2.3. PPA 2.2.1: Bi-Annual Barangay-Wide Multi-Hazard Drills: Targeting community-level engagement, this activity conducts multi-hazard drills in eight high-risk barangays, with a 90% household participation target. The drills aim to familiarize residents with evacuation and safety procedures, enhancing grassroots preparedness and public awareness.

5.2.4. PPA 2.2.2: Production and Distribution of Localized Public Information Videos: This initiative complements drills by creating localized educational videos on disaster preparedness. Aired in barangays, schools, and terminals, the content raises awareness of local hazards and safety protocols, aiming to reach at least 5,000 individuals with consistent messaging.

5.3. Thematic Area 3: Disaster Response

5.3.1. PPA 3.1.1: Development of an Integrated Logistics Management Information System (ILMIS): To improve the speed and efficiency of relief delivery, this project establishes a centralized logistics management platform. The system allows real-time tracking of supplies and aims to ensure that aid reaches affected communities within 24 hours post-disaster.

5.3.2. PPA 3.1.2: Logistics Coordination Training Workshops: Supporting the logistics system, this PPA provides formal training for logistics staff from the city and barangays. The workshops teach standardized procedures for inventory and coordination, addressing previously inconsistent practices and improving post-disaster response.

5.3.3. PPA 3.2.1: Renovation and Expansion of Evacuation Centers: This infrastructure-focused PPA upgrades three evacuation centers, doubling their capacity to accommodate 1,500 evacuees in total. It includes improvements to water, sanitation, and electrical systems, ensuring that facilities are safe, functional, and compliant with emergency shelter standards.

5.4. Thematic Area 4: Disaster Rehabilitation and Recovery

5.4.1. PPA 4.1.1: Post-Disaster Infrastructure Assessment Team Mobilization: This project activates a 10-member team to conduct rapid damage assessments within 14 days after a disaster. The assessments inform targeted infrastructure rehabilitation plans for critical sites affecting approximately 5,000 residents.

5.4.2. PPA 4.1.2: Development of Detailed Infrastructure Rehabilitation Plans: Following assessment, this activity develops structured recovery plans within three months post-disaster. The plans address infrastructure needs per barangay, ensuring that rebuilding is informed by technical data and community input to support resilient and timely recovery.

ACKNOWLEDGEMENT

I extend my heartfelt gratitude to Almighty God for His guidance and strength throughout the completion of this action plan. I sincerely thank my research adviser for their valuable insights and support, as well as all those who contributed—through knowledge, time, and encouragement—to the success of this work. Your collective efforts have been instrumental in shaping this plan into a meaningful contribution to disaster risk reduction and community resilience.

REFERENCES:

Bawagan, A. B. (2011). Community-based disaster risk reduction and management framework: Lessons from implementation. *Philippine Journal of Social Development*, 3. https://cswcd.upd.edu.ph/wp-content/uploads/2021/10/PJSD-Vol-3-2011_Bawagan.pdf

Cavite Provincial Government. (2015). *Provincial disaster risk reduction and management plan 2015–2020*. https://wvphilippineshea.files.wordpress.com/2015/06/cavite-pdrrm- plan.pdf

City Government of *Tagaytay*. (n.d.). *Ecological profile*.https://tagaytay.gov.ph/pdf/Ecological%20Profile.pdf

City Government of Tagaytay. (2023). *Comprehensive land use plan (2023–2032)*. https://tagaytay.gov.ph/pdf/CLUP.pdf

Department of Social Welfare and Development. (2022, July 19). *DSWD provides assistance to victims of the Tagaytay landslide incident*. https://reliefweb.int/report/philippines/dswd-provides-assistance-victims- tagaytay-landslide-incident

Doroteo, H. J. E. (2024). *Philippines: Disaster risk profile and disaster risk reduction (DRR) framework: Natural calamities*.

Froude, M. J., & Petley, D. N. (2018). Global fatal landslide *occurrence* from 2004 to 2016. *Natural Hazards and Earth System Sciences, 18*(8), 2161–2181. https://doi.org/10.5194/nhess-18-2161-2018

Gariano, S. L., & Guzzetti, F. (2016). Landslides in a changing climate. *Earth- Science Reviews, 162*, 227–252. https://doi.org/10.1016/j.earscirev.2016.08.002

GMA News Online. (2024, October 25). Landslide hits Tagaytay street due to Kristine.https://www.gmanetwork.com/news/content/photo/448216/landslid e-hits-tagaytay-street-due-to-kristine/photo/

Government of Venezuela. (1999). *Vargas tragedy: Report on the impact and response efforts*. Caracas, Venezuela.

Hiroshima Prefectural Government. (2014). *Report on the August* 2014 *Hiroshima landslides*. Hiroshima, Japan.

Intergovernmental Panel on Climate Change. (2021). *Climate change 2021: The physical science basis*. Cambridge

