

**STRATEGIC INITIATIVE: DISASTER RISK REDUCTION AND MANAGEMENT
ACTION PLAN FOR PILILLA, RIZAL
BUILDING RESILIENCE AGAINST TYPHOON, FLOODING AND LEPTOSPIROSIS**

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Abstract

This study developed a Disaster Risk Reduction and Management Action Plan for the Municipality of Pililla, Rizal, focusing on the interconnected hazards of typhoons, flooding, and leptospirosis. Located along the eastern portion of Luzon and adjacent to Laguna de Bay, Pililla is a first-class urban municipality with a population of 71,535 (2020 Census) spread across nine barangays.

The municipality faces recurring hydro-meteorological hazards that threaten communities, infrastructure, livelihoods, and public health.

Using a descriptive research design with a mixed-methods approach, the study employed structured survey questionnaires with a 4-point Likert scale, semi-structured interviews, document reviews, and consultations with local officials, MDRRMO staff, barangay representatives, and community members in hazard-prone areas. A total of 20 respondents from highly exposed barangays participated in the study. Findings revealed that 100% of respondents identified flood and typhoon as major hazards, while 60% recognized leptospirosis as a health hazard.

Key gaps include poor communication systems during emergencies (identified by 60% of respondents), limited transportation for evacuation (40%), inadequate drainage and flood control infrastructure, insufficient medical and sanitation resources, and limited household preparedness—only 40% of households have emergency go-bags, and only 15% had attended DRRM training in the last two years.

The proposed Disaster Risk Reduction and Management Action Plan (2027–2029) addresses the four DRRM thematic areas: Disaster Prevention and Mitigation, Disaster Preparedness, Disaster Response, and Disaster Rehabilitation and Recovery.

Key interventions include improving drainage and flood-control structures, strengthening early warning systems through SMS and social media, conducting quarterly DRRM and health preparedness seminars, procuring rescue boats and emergency vehicles, upgrading evacuation centers with sanitation facilities, deploying health monitoring teams, providing livelihood assistance and skills training, and implementing leptospirosis prevention measures including doxycycline prepositioning.

The plan emphasizes institutional strengthening, community participation, and partnerships with government agencies and NGOs to build long-term resilience. For fiscal year 2026, the Municipality of Pililla has appropriated Php 20,001,547.00 for the Municipal Disaster Risk Reduction and Management Fund (MDRRMF), with Php 6,000,465.00 allocated as the Quick Response Fund.

Keywords: Disaster Risk Reduction and Management, Typhoon, Flooding, Leptospirosis, Multi-Hazard, Pililla Rizal, Community Resilience

1. INTRODUCTION

Typhoons, flooding, and health-related hazards remain among the most pressing and interconnected risks affecting communities worldwide. The United Nations Office for Disaster Risk Reduction emphasizes that climate change has intensified hydro-meteorological hazards, particularly tropical cyclones and extreme rainfall events. These hazards are no longer isolated occurrences; instead, they produce cascading impacts such as widespread flooding, displacement, livelihood disruption, and the deterioration of public health conditions.

Within Southeast Asia, the Philippines is widely recognized as one of the most hazard-prone countries due to its exposure to the Pacific typhoon belt. According to the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), the country experiences an average of around 20 tropical cyclones annually, with several making landfall and bringing intense rainfall and strong winds. These events frequently result in severe flooding in both urban and rural areas. Beyond the immediate physical damage, post-disaster conditions often trigger outbreaks of diseases such as dengue and leptospirosis, placing additional strain on already limited healthcare systems.

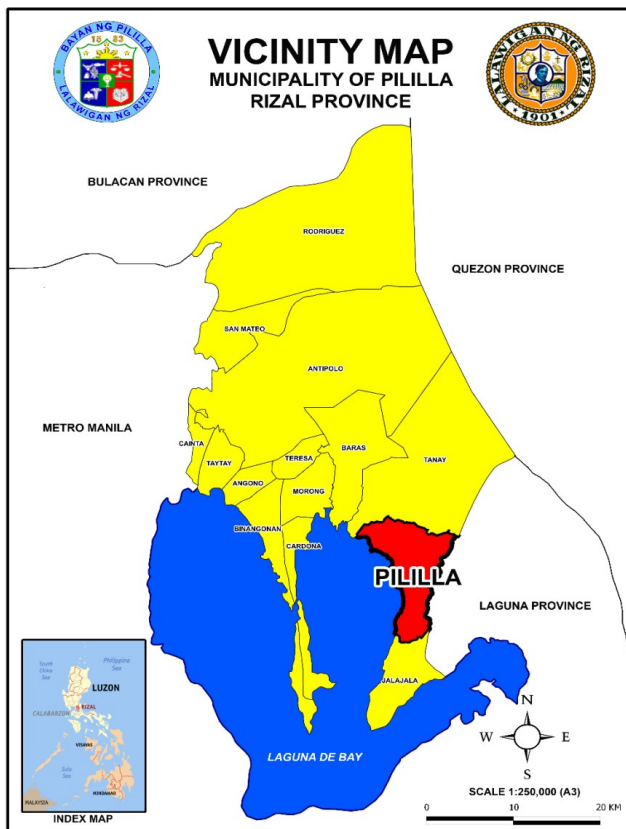
At the local level, the Municipality of Pililla reflects these broader national vulnerabilities but with context-specific risk dynamics. Located along the eastern portion of Luzon and adjacent to Laguna de Bay, Pililla is particularly susceptible to typhoon-induced hazards. Strong winds and prolonged rainfall during typhoons often lead to flooding in low-lying and lakeshore barangays, primarily due to lake overflow, rising river levels, and drainage congestion. These flooding events can persist for extended periods, disrupting mobility, damaging homes and infrastructure, and affecting local livelihoods—especially among fisherfolk and farming communities.

The impact of these hazards is further compounded by health-related risks. Floodwaters increase the likelihood of waterborne and vector-borne diseases, particularly in densely populated or resource-constrained areas. Stagnant water becomes breeding grounds for mosquitoes, contributing to dengue transmission, while contaminated floodwater exposes residents to leptospirosis. These recurring health threats highlight the strong linkage between environmental hazards and public health, underscoring the need for integrated risk management approaches.

Leptospirosis, in particular, is a significant public health concern in flood-prone areas such as Pililla. It is a zoonotic disease caused by pathogenic *Leptospira* bacteria, which are transmitted to humans through direct contact with water, soil, or food contaminated with the urine of infected animals, particularly rodents, dogs, and livestock. The incubation period ranges from 2 to 30 days, and symptoms can vary from mild flu-like illness to severe complications including kidney damage, liver failure, meningitis, and respiratory distress.

During flooding events, the risk of leptospirosis transmission increases dramatically as residents wade through contaminated floodwaters, especially in areas with poor sanitation and high rodent populations. The Department of Health (DOH) has consistently identified leptospirosis as a priority disease during the rainy season and flooding events.

In response, this action plan for Pililla adopts a focused multi-hazard framework that addresses: (1) typhoons and strong winds; (2) flooding resulting from intense rainfall, lake overflow, and drainage limitations; and (3) leptospirosis. By clearly defining and limiting the scope to these priority risks, the plan ensures targeted, efficient, and context-responsive interventions.



Vicinity Map of Pililla, Rizal showing location relative to Laguna de Bay and surrounding municipalities

2. SITUATIONAL ANALYSIS

Pililla is a first-class urban municipality in the Province of Rizal, characterized by a diverse landscape of agricultural lands, lakeshore communities, and hilly to mountainous terrain. Its proximity to Laguna de Bay increases its susceptibility to flooding, particularly during periods of heavy rainfall and lake level rise. Situated along the typhoon belt of the Philippines, Pililla is routinely exposed to strong winds, intense rainfall, and associated secondary hazards. The municipality's growing population, expanding settlements, and increasing pressure on natural resources further heighten its vulnerability to disasters.

Historical records show that Pililla has experienced multiple typhoons and severe weather disturbances over the past decades. Typhoon Ondoy (international name: Ketsana) in

2009 caused widespread flooding and triggered the overflow of Laguna de Bay, submerging lakeshore areas in Rizal Province for extended periods. The August 2012 flash flood destroyed houses and agricultural lands, with water levels rising up to 7 feet and forcing coastal residents to evacuate for three to four months. In 2014, Typhoon Glenda brought destructive winds that damaged homes, uprooted trees, and disrupted power lines. Typhoon Ulysses (international name: Vamco) in 2020 resulted in severe inundation, prolonged power outages, and significant livelihood losses. More recently, Severe Tropical Storm Kristine (international name: Trami) in October 2024 caused the Pililla River to rise to critical levels, threatening adjacent settlements. Severe Tropical Storm Enteng (international name: Yagi) in September 2024 produced roof-level flooding in Barangay Hulo, underscoring the increasing exposure of low-lying and informal settlements.

Baseline data from the Local Disaster Risk Reduction and Management Plan and ecological profile reinforce the urgency of targeted interventions. Pililla covers a total land area of 69.95 km² and is subdivided into nine barangays. According to the 2020 Census by the Philippine Statistics Authority, the municipality had a population of 71,535. Its major economic activities include agriculture, fishing, and tourism, anchored by the Pililla Wind Farm. Risk assessment data indicate that a significant portion of the municipal area is flood-susceptible, with Barangays Imatong, Takungan, and Wawa identified among the most vulnerable. Landslide susceptibility affects thousands of hectares across all nine barangays, with Malaya and Halayhayin registering high exposure.

For fiscal year 2026, the Municipality of Pililla has appropriated a total of Php 20,001,547.00 for the Municipal Disaster Risk Reduction and Management Fund (MDRRMF). Of this amount, Php 6,000,465.00 is allocated as the Quick Response Fund (QRF) for relief and recovery programs, while the remaining balance supports disaster preparedness, prevention, mitigation, and rehabilitation activities.

The socio-economic profile of Pililla reveals a population reliant on agriculture, fishing, small-scale businesses, and tourism—livelihoods highly sensitive to climate-related disruptions. Many households have limited financial capacity to recover from disasters, increasing their vulnerability to prolonged impacts. Critical facilities such as schools, barangay halls, health centers, evacuation sites, water systems, and road networks play essential roles during emergencies but remain at risk from flooding, landslides, and strong winds. Environmental assessments indicate ongoing deforestation in upland areas, siltation in waterways, and pollution in Laguna de Bay, all of which contribute to higher flood risks.

MULTI-HAZARD SCENARIO

A focused multi-hazard scenario for the Municipality of Pililla highlights the strong interconnection between typhoons, flooding, and leptospirosis. These hazards do not occur in isolation; rather, they unfold across the four thematic areas of Disaster Risk Reduction and Management, creating compounding and cascading impacts on communities, systems, and local governance.

Phase 1: Disaster Prevention and Mitigation (Pre-Event Conditions) — Prior to a disaster, Pililla's risk profile is

shaped by its proximity to Laguna de Bay, the presence of low-lying and flood-prone barangays, and drainage limitations in built-up areas. Informal settlements near waterways, inadequate solid waste management, and limited flood control infrastructure contribute to increased exposure and vulnerability. Without adequate mitigation measures such as improved drainage systems, land-use regulation, and WASH infrastructure, communities remain highly susceptible to both physical and health-related impacts.

Phase 2: Disaster Preparedness (Before Impact) —

As a typhoon approaches, early warning systems and preparedness mechanisms are activated. PAGASA issues forecasts indicating heavy rainfall over Southern Luzon, prompting the Local Government Unit to initiate pre-emptive actions such as evacuation planning, information dissemination, and coordination with barangay officials. However, gaps in risk communication, limited household preparedness, and insufficient pre-positioning of medical supplies may affect the readiness of communities—particularly in high-risk areas like Malaya, Wawa, and Hulo.

Phase 3: Disaster Response (During and Immediately After the Event) — When the typhoon makes landfall, continuous heavy rainfall leads to rising water levels in Laguna de Bay, resulting in backflow and widespread flooding across lakeshore and low-lying barangays. Homes, roads, and public facilities become inundated, forcing families into evacuation centers. At the same time, health risks rapidly emerge. Floodwaters contaminated with waste and animal urine expose residents to leptospirosis, especially those wading through floodwaters without protection. Overcrowded evacuation centers, coupled with limited access to clean water and sanitation facilities, increase the spread of gastrointestinal illnesses.

Phase 4: Disaster Rehabilitation and Recovery (Post-Event) — As floodwaters gradually recede, Pililla transitions into recovery. However, the impacts persist beyond the immediate damage. Households begin rebuilding homes and restoring livelihoods, particularly in agriculture and fishing sectors affected by prolonged flooding. Simultaneously, public health concerns continue, as cases of leptospirosis and gastrointestinal diseases may increase days or weeks after exposure. Recovery efforts must therefore extend beyond infrastructure repair to include sustained health interventions.

PESTEL ANALYSIS

A PESTEL analysis was conducted to examine the external factors influencing the municipality's disaster risk profile.

Political Factors — The local government of Pililla plays a significant role in implementing policies, programs, and ordinances related to economic development, tourism, infrastructure, environmental protection, and disaster risk reduction management. Government support through local initiatives, coordination with national agencies, and implementation of development plans contribute to community progress and public safety. However, changes in leadership and budget allocation may affect the continuity and effectiveness of local programs.

Economic Factors — The economy of Pililla is primarily supported by agriculture, small businesses, tourism, and local enterprises. The municipality benefits economically

from tourism attractions such as the windmills and natural landscapes, which generate employment opportunities. However, inflation, unemployment, limited business investments, and economic disruptions caused by natural hazards may negatively affect economic growth and financial stability.

Social Factors — Pililla has a growing population with strong community participation and cultural values that contribute to social cohesion during emergencies. Educational institutions, health services, and community programs support the welfare of residents. Nevertheless, challenges such as poverty, limited access to healthcare services in remote areas, and varying levels of disaster awareness may still affect the quality of life and resilience of some residents.

Technological Factors — Technological advancements provide opportunities for Pililla to improve communication systems, disaster preparedness, and early warning systems. The use of social media platforms, mobile communication, and digital systems helps facilitate information dissemination. However, limited access to advanced technology, unstable internet connectivity in some areas, and insufficient technological infrastructure may hinder efficient communication and service delivery.

Environmental Factors — Environmental conditions greatly influence the municipality due to its vulnerability to natural hazards such as typhoons, flooding, landslides, and the effects of climate change. Environmental protection initiatives, waste management programs, and reforestation activities are important in reducing disaster risks. However, environmental degradation, improper waste disposal, deforestation, and extreme weather conditions continue to pose threats to public safety, agriculture, infrastructure, and economic activities.

Legal Factors — The municipality operates in accordance with national and local laws related to governance, environmental protection, disaster risk reduction management, and public safety. Compliance with laws such as the Philippine Disaster Risk Reduction and Management Act of 2010 supports the implementation of disaster preparedness programs. However, challenges in policy implementation, enforcement of regulations, and resource limitations may affect the effectiveness of legal compliance.

SWOC ANALYSIS

SWOC analysis was conducted across all four DRRM thematic areas to identify internal strengths and weaknesses, as well as external opportunities and challenges.

SWOC for Disaster Preparedness

Strengths: Active involvement of the local government in implementing DRRM programs; established coordination with barangay officials, rescue teams, and community volunteers; regular dissemination of advisories through community announcements and social media; presence of community participation during evacuation, relief operations, and clean-up drives; existence of designated evacuation centers.

Weaknesses: Poor communication system during emergencies; delayed dissemination of information and limited access to reliable communication channels; limited transportation and emergency resources; insufficient rescue vehicles, equipment, and medical supplies; some evacuation

centers lack adequate facilities; limited funding and insufficient training programs for community members.

Opportunities: Development and improvement of evacuation centers equipped with proper facilities, medical supplies, and sanitation; strengthening partnerships with national government agencies, NGOs, and private institutions; enhancing community awareness campaigns and disaster education programs; use of modern technology such as mobile alerts, social media, and early warning systems.

Challenges: Increasing occurrence of disasters caused by climate change, including stronger typhoons, heavy rainfall, flooding, and landslides; limitation in financial resources needed to fully implement DRR programs; geographic and transportation barriers; ensuring consistent community participation and maintaining public awareness.

SWOC for Disaster Response

Strengths: Active participation and coordination of local government units, barangay officials, rescue teams, and community volunteers during emergencies; immediate mobilization of responders; presence of evacuation centers and community cooperation; strong community resilience and solidarity.

Weaknesses: Poor communication systems during emergencies delaying dissemination of warnings and evacuation instructions; limited transportation resources and insufficient emergency equipment; some evacuation centers lack adequate facilities, sanitation, and medical supplies; limited funding and insufficient disaster response training.

Opportunities: Strengthening partnerships with government agencies, NGOs, and private institutions; procurement of modern rescue equipment, emergency vehicles, and communication systems; conducting regular disaster drills, seminars, and community awareness programs; integration of technology such as mobile alerts and early warning systems.

Challenges: Increasing frequency and intensity of disasters caused by climate change; geographic barriers and damaged roads during disasters; financial limitations; ensuring continuous public cooperation and awareness.

SWOC for Disaster Prevention and Mitigation

Strengths: Active implementation of local government programs aimed at reducing disaster risks; disaster awareness campaigns, environmental protection activities, and coordination with barangay officials; presence of local DRRM committees; cooperation and participation of community members in clean-up drives, tree planting, and evacuation drills.

Weaknesses: Limited availability of modern equipment, facilities, and financial resources needed to fully implement mitigation programs; some areas lack proper drainage systems and flood control structures; poor communication systems and insufficient dissemination of information; limited community training and inadequate public awareness regarding disaster prevention practices.

Opportunities: Partnerships with national government agencies, NGOs, and private institutions for funding and technical assistance; development of improved infrastructure such as flood control systems and drainage facilities; use of technology and modern communication systems for early

warning dissemination; promoting sustainable environmental practices such as reforestation and waste management.

Challenges: Increasing impact of climate change contributing to stronger typhoons, flooding, and landslides; limitation in budget allocation for DRR projects; insufficient manpower, lack of advanced equipment, and limited technical expertise; sustaining active community participation and ensuring public compliance with disaster prevention measures.

SWOC for Disaster Rehabilitation and Recovery

Strengths: Active support and coordination among local government units, community leaders, and various organizations in providing assistance after disasters; immediate conduct of relief operations, clean-up drives, and rehabilitation programs; ability to coordinate with national government agencies and humanitarian organizations for financial assistance, relief goods, and medical services.

Weaknesses: Limited financial resources and insufficient funding may delay reconstruction of damaged infrastructure; slow recovery due to inadequate access to rehabilitation materials and livelihood assistance; limited availability of long-term recovery programs addressing psychological and economic needs; poor coordination may hinder efficient distribution of assistance; inadequate disaster-resilient infrastructure may increase risk of repeated damage.

Opportunities: Strengthening partnerships with government agencies, private organizations, and NGOs for additional funding and technical expertise; implementation of sustainable and disaster-resilient infrastructure projects; livelihood assistance programs, skills training, and community-based recovery initiatives; integrating mental health and psychosocial support services into recovery programs.

Challenges: Increasing frequency and severity of disasters caused by climate change resulting in repeated destruction; limited budget allocation and insufficient resources; restoring normal living conditions and economic stability of affected residents; geographic limitations and damaged transportation routes; maintaining long-term community participation and ensuring sustainable rehabilitation efforts.

3. GOALS AND OBJECTIVES

The Disaster Risk Reduction and Management Action Plan (2027–2029) is structured around four thematic areas, each with specific goals and objectives derived from the situational analysis findings.

Disaster Prevention and Mitigation

Goal: To reduce the risks and impacts of flooding, typhoons, and leptospirosis in Pililla by strengthening flood mitigation infrastructure, environmental sanitation programs, and public health awareness, resulting in at least 85% of households practicing proper waste segregation and sanitation, quarterly clean-up drives maintained in all flood-prone barangays, and at least 85% of residents demonstrating awareness of leptospirosis prevention and flood safety measures within two (2) years.

Objectives:

- To conduct quarterly information campaigns on flood prevention, typhoon safety, sanitation, and

leptospirosis prevention in all identified hazard-prone barangays starting in 2027.

- To improve drainage systems, waterways, and flood control structures in flood-prone communities by the end of 2028.
- To implement regular clean-up drives and waste management activities to reduce stagnant water and contamination sources associated with leptospirosis within one year.
- To strengthen early warning systems and hazard communication mechanisms for flooding and typhoons through social media, SMS alerts, and barangay advisories by mid-2028.

Disaster Preparedness

Goal: To enhance household and community preparedness against flooding, typhoons, and leptospirosis by increasing DRRM training participation, emergency preparedness practices, and health awareness by at least 70% within two (2) years.

Objectives:

- To conduct quarterly DRRM and health preparedness seminars focusing on typhoon response, flood evacuation, and leptospirosis prevention beginning in 2027.
- To increase the number of households with emergency go-bags, first aid kits, and sanitation supplies from 40% to at least 80% within two years.
- To ensure that at least 85% of residents are aware of designated evacuation centers, evacuation routes, and flood safety protocols within one year.
- To distribute educational materials on proper sanitation, clean water practices, and disease prevention measures to all households in hazard-prone areas within one year.

Disaster Response

Goal: To improve the effectiveness and timeliness of disaster response operations during flooding and typhoon incidents in Pililla, Rizal by strengthening emergency communication systems, evacuation resources, and health emergency response services within two (2) years.

Objectives:

- To procure additional rescue boats, emergency vehicles, communication equipment, and medical supplies for flood and typhoon emergencies by the end of 2027.
- To establish a reliable emergency communication and warning system accessible to all barangays within one year.
- To strengthen evacuation center operations by ensuring adequate sanitation facilities, clean water supply, and medical support to prevent leptospirosis during disasters by mid-2028.

Rehabilitation and Recovery

Goal: To strengthen post-disaster rehabilitation and recovery programs in Pililla, Rizal by improving resilient infrastructure, restoring livelihoods, and enhancing public health recovery services following flooding and typhoon events within three (3) years.

Objectives:

- To rehabilitate and improve damaged flood-prone infrastructure, drainage systems, and evacuation facilities using disaster-resilient standards by 2028.
- To provide livelihood recovery assistance and financial support programs to at least 70% of flood- and typhoon-affected households within two years after disaster events.
- To integrate medical assistance, psychosocial support, and leptospirosis monitoring into post-disaster recovery programs within one year.
- To strengthen partnerships with government agencies, NGOs, and private organizations for long-term rehabilitation and recovery support within three years.

4. ACTION PLAN

The Action Plan is organized into Programs, Projects, and Activities (PPAs) aligned with the goals and objectives per thematic area. The following tables present selected PPA matrices that illustrate the scope, targets, responsible offices, timeframes, and budget allocations.

Disaster Prevention and Mitigation

PPA Matrix: Goal 1 – Objective 1.1 (Information Campaigns)

PPA	Target	Responsible Office	Timeframe	Budget
Conduct Quarterly Information and Awareness Campaigns on Flood Prevention, Typhoon Preparedness, and Leptospirosis Prevention	Residents in hazard-prone barangays, youth, women, elderly, persons with disabilities	MDRRMO, Municipal Health Office, Barangay DRRM Committees	Quarterly beginning 2027	Php 50,000/year – MDRRMF, LGU Fund, Barangay DRRM Fund
Conduct Barangay-Based Seminars and IEC Dissemination	Household residents, barangay officials, community leaders, school representatives	MDRRMO, Municipal Health Office, Barangay DRRM Committees	Quarterly beginning 2027	Php 50,000/year – MDRRMF, LGU Fund, Barangay DRRM Fund

PPA Matrix: Goal 1 – Objective 1.2 (Drainage and Flood Control)

PPA	Target	Responsible Office	Timeframe	Budget
Maintenance of Drainage Systems and Waterways	Flood-prone barangays and nearby households	Municipal Engineering Office, MDRRM, MENRO, Barangay DRRM Committees	2027–2028	Php 50,000/year – MDRRMF, LGU Fund, Barangay DRRM Fund
Construction and Improvement of Flood Control Structures	Flood-prone barangays, lakeshore communities, low-lying areas	Municipal Engineering Office, MDRRM, DPWH, Barangay LGUs	2027–2028	Subject to external funding – DPWH, NDRRMF, LGU Fund, NGO Support

Disaster Preparedness

PPA Matrix: Goal 2 – Objective 2.1 (DRRM and Health Preparedness Seminars)

PPA	Target	Responsible Office	Timeframe	Budget
Conduct Quarterly DRRM and Health Preparedness Seminars	Residents in hazard-prone barangays, barangay officials, community volunteers, school representatives	MDRRMO, Municipal Health Office, Barangay DRRM Committees	Quarterly beginning 2027	Php 80,000/year – MDRRMF, LGU Fund, DOH Assistance
Conduct Community Simulation Drills and Evacuation Exercises	Household residents, students, teachers, barangay officials, responders	MDRRMO, DepEd, Barangay DRRM Committees, Rescue Teams	Semi-annually beginning 2027	Php 120,000 – LGU General Fund

PPA Matrix: Goal 2 – Objective 2.2 (Household Preparedness)

PPA	Target	Responsible Office	Timeframe	Budget
Conduct Household Preparedness Orientation and Go-Bag Campaign	Households in hazard-prone barangays	MDRRMO, Barangay DRRM Committees, Municipal Health Office	2027–2028	Php 75,000/year – MDRRMF, LGU Fund
Distribution of Sanitation and Emergency Preparedness Checklists	Community households in hazard-prone areas	MDRRMO, Municipal Health Office, Barangay Health Workers	2027	Php 40,000 – MDRRMF, LGU Fund

Disaster Response

PPA Matrix: Goal 3 – Objective 3.1 (Rescue Equipment and Emergency Vehicles)

PPA	Target	Responsible Office	Timeframe	Budget
Procurement of Rescue Boats, Emergency Vehicles, and Rescue Equipment	MDRRMO personnel, rescue teams, flood-prone communities	MDRRMO, LGU, BFP, Barangay DRRM Committees	By end of 2027	Php 250,000/year – LDRRMF, LGU Fund, NDRRMF, NGO Support
Procurement and Distribution of Emergency Medical Supplies and Communication Equipment	Evacuation centers, health responders, affected residents	MDRRMO, Municipal Health Office, RHU, Barangay Health Workers	By end of 2027	Php 120,000/year – LDRRMF, LGU Fund, DOH Assistance

PPA Matrix: Goal 3 – Objective 3.3 (Evacuation Center Operations)

PPA	Target	Responsible Office	Timeframe	Budget
Improvement of Sanitation Facilities and Clean Water Systems in Evacuation Centers	Evacuees, displaced families, vulnerable sectors	Municipal Health Office, MDRRM, Municipal Engineering Office, Barangay LGUs	By mid-2028	Php 150,000 – LDRRMF, LGU Fund, DOH Assistance
Deployment of Medical Assistance and Health Monitoring Teams in Evacuation Centers	Evacuees, displaced families, vulnerable sectors	Municipal Health Office, RHU, MDRRM, Barangay Health Workers	Quarterly beginning 2027	Php 85,000/year – LDRRMF, LGU Health Fund, DOH Assistance

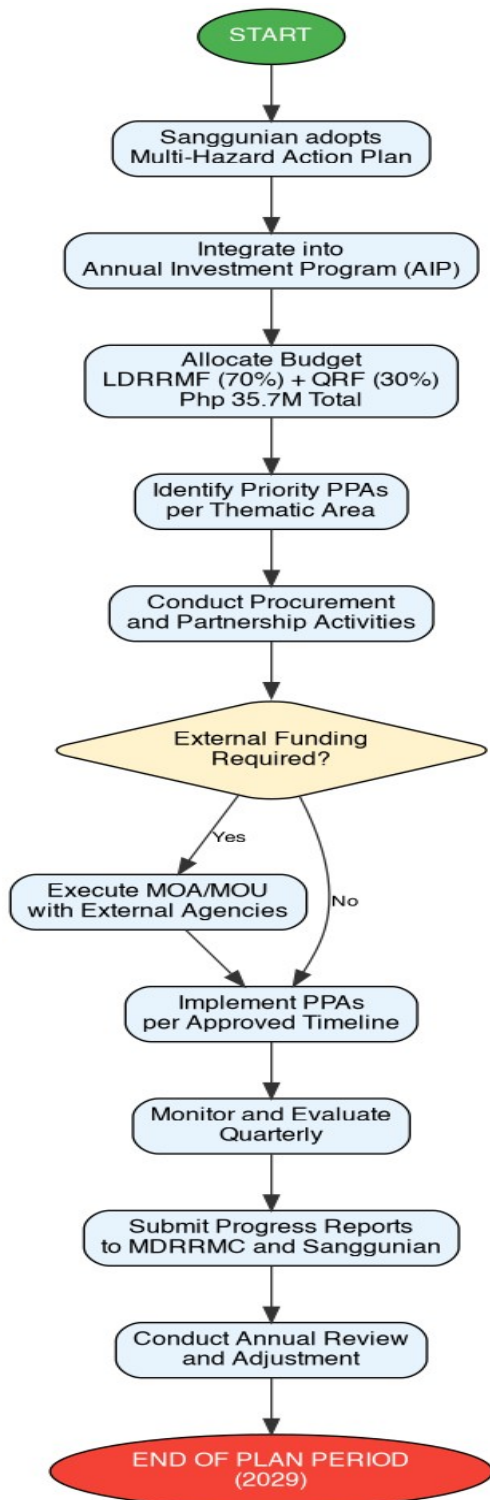
Disaster Rehabilitation and Recovery

PPA Matrix: Goal 4 – Objective 4.2 (Livelihood Recovery)

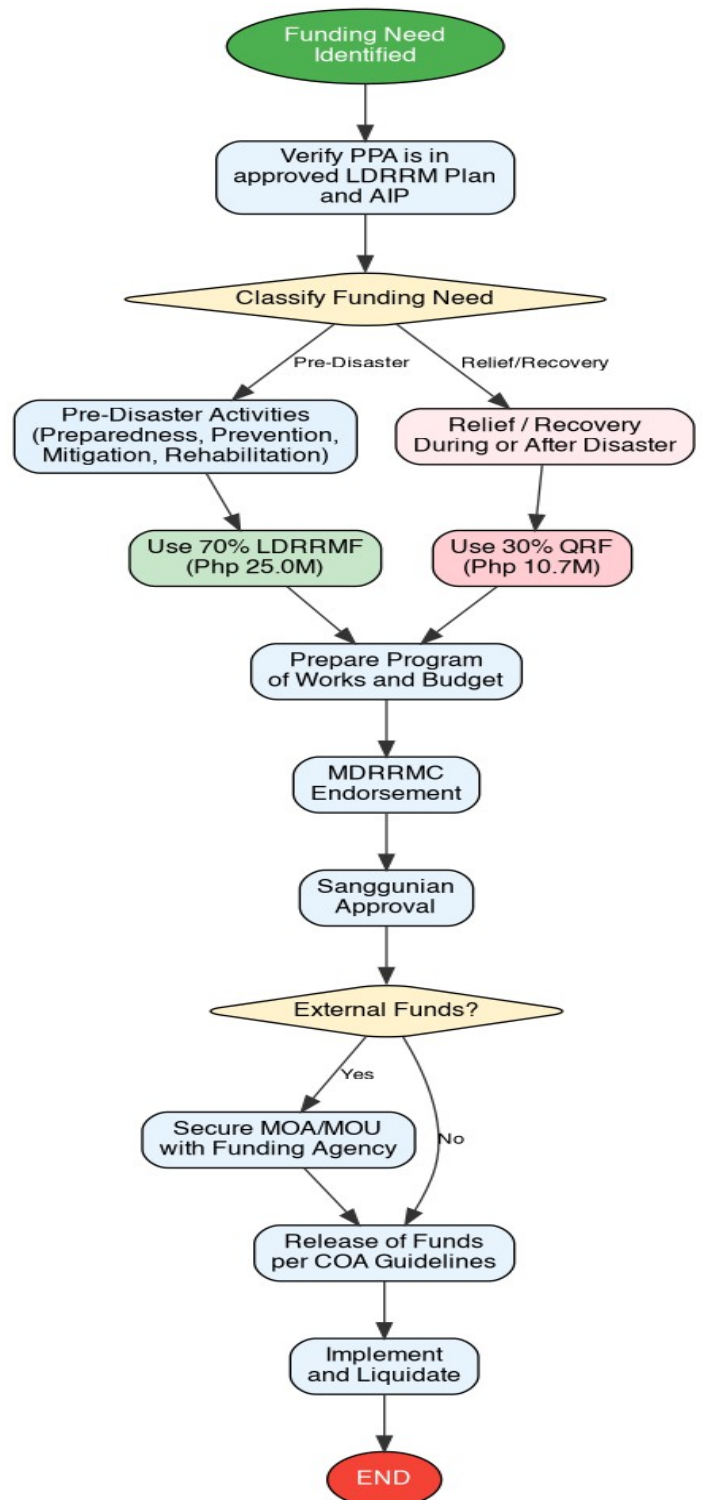
PPA	Target	Responsible Office	Timeframe	Budget
Implementation of Livelihood Assistance and Skills Training Programs	Flood- and typhoon-affected households, unemployed residents, farmers, fisherfolk	MSWDO, MDRRM, TESDA, DA, Barangay LGUs	2027–2029	Php 1,500,000 – LDRRMF, DSWD Assistance, TESDA Support, NGO/Private Sector
Provision of Financial Aid and Recovery Support to Disaster-Affected Families	Disaster-affected families, low-income households, displaced residents	MSWDO, MDRRM, DSWD, Barangay LGUs	Within one year after disaster	Php 50,000 – LDRRMF, DSWD Assistance, NGO/Private Sector

PPA Matrix: Goal 4 – Objective 4.3 (Health Recovery and Psychosocial Support)

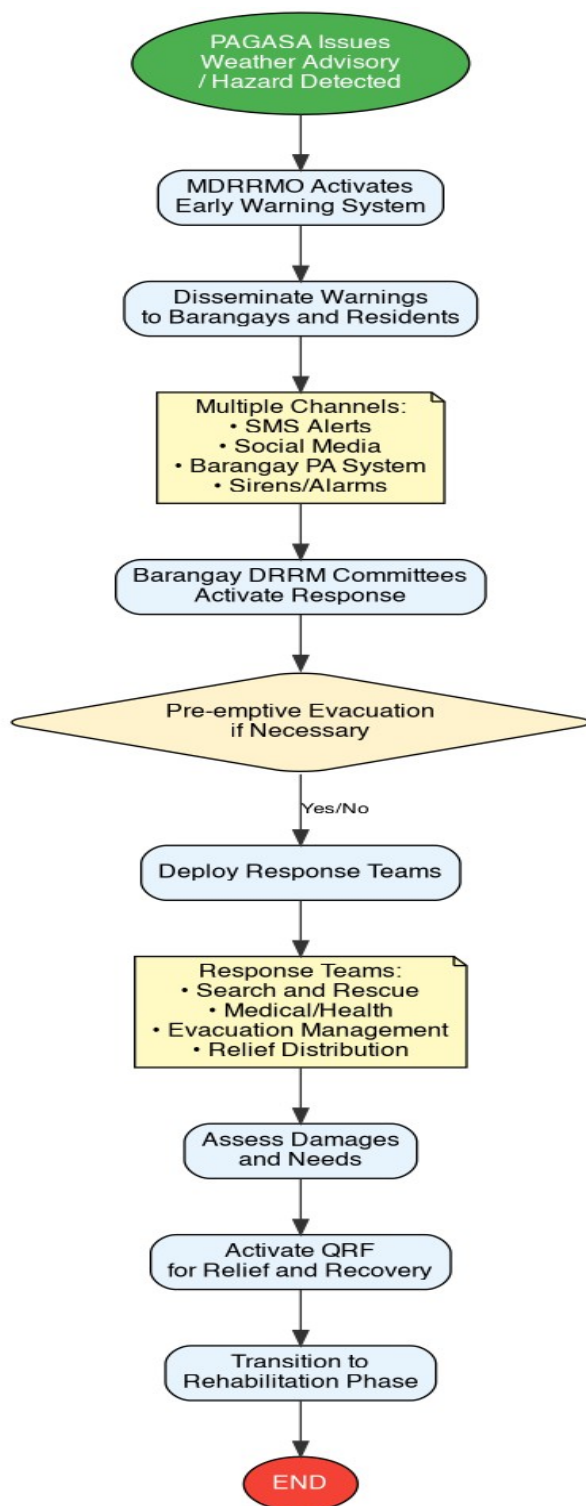
PPA	Target	Responsible Office	Timeframe	Budget
Conduct Medical Missions and Post-Disaster Health Monitoring Activities	Disaster-affected residents, evacuees, vulnerable groups	RHU, MDRRM, DOH, Barangay Health Workers	Quarterly and post-disaster	Php 50,000 – LDRRMF, DOH Assistance, LGU Health Fund
Provide Psychosocial Intervention and Counseling Services	Disaster-affected individuals, children, elderly, displaced families	MSWDO, RHU, MDRRM, DepEd	Quarterly and post-disaster	Php 25,000 – LDRRMF, DOH Assistance, MSWDO Fund



Overall Implementation Process Flowchart



Funding Access Procedure Flowchart



Disaster Response Activation Flowchart

5. MONITORING AND EVALUATION

Monitoring and evaluation of the programs, projects, and activities assigned to the goals and objectives of this action plan will guide the LGU to identify and proactively solve possible impediments that may hinder implementation. Each PPA has a corresponding Monitoring and Evaluation framework that includes:

- **Baseline Data:** Documenting the current conditions and gaps identified through the situational analysis and survey results.
- **Objectively Verifiable Indicators (OVIs):** Measurable standards to assess program effectiveness, such as percentage of households reached, number of activities conducted, and reduction in reported incidents.
- **Data Sources and Collection Methods:** MDRRMO reports, barangay DRRM records, Municipal Health Office reports, attendance sheets, survey results, evaluation forms, activity documentation, and field inspections.
- **Monitoring Frequency:** Quarterly monitoring is essential for most PPAs, with additional inspections during typhoon seasons and periods of heavy rainfall.
- **Responsible Offices:** MDRRMO serves as the lead coordinating body, working with the Municipal Health Office, Municipal Engineering Office, MENRO, MSWDO, Barangay DRRM Committees, and partner agencies.
- **Assumptions and Risks:** Frameworks assume active participation from residents and barangay officials, availability of funding, and cooperation among agencies. Risks include limited funding, scheduling conflicts, weather disruptions, low community participation, and insufficient technical expertise.

The success of the M&E framework depends on active participation and coordination among all stakeholders. After-activity reports and scheduled reports are copy-furnished by the MDRRMO and monitored by the MDRRMC or Sangguniang Barangay members for validation and verification.

6. CONCLUSIONS

The study concludes that the Municipality of Pililla, Rizal remains highly vulnerable to the interconnected hazards of typhoons, flooding, and leptospirosis. The analysis of historical disaster records, ecological profiles, and survey data from 20 respondents in hazard-prone barangays revealed persistent gaps in the municipality's disaster risk reduction and management system.

The findings revealed that while Pililla has existing DRRM mechanisms such as evacuation systems and early warning dissemination, significant weaknesses persist. These include poor communication systems during emergencies, limited transportation and emergency resources, inadequate drainage and flood control infrastructure, insufficient medical and sanitation resources in evacuation centers, and limited livelihood recovery support. Health-related risks, particularly leptospirosis, compound these vulnerabilities, with only 60% of respondents aware of this disease despite its serious public health implications during flooding events.

Household preparedness remains inadequate, with only 40% of households possessing emergency go-bags and only 15% having attended DRRM training in the last two years. While 80% of respondents are aware of designated evacuation centers, 20% remain uninformed, highlighting gaps in information dissemination. The majority of residents receive hazard information only occasionally, with social media (85%) and TV/Radio (65%) serving as the dominant sources.

The study further established that community participation, institutional strengthening, and proactive prevention strategies are essential in minimizing disaster risks and building long-term resilience. Through the proposed action plan, the municipality is provided with a strategic framework that enhances preparedness, strengthens operational response, improves infrastructure resilience, and fosters community-based disaster resilience. Integrating health risk management—particularly leptospirosis prevention—into local DRRM planning is necessary to establish a more comprehensive, inclusive, and sustainable disaster management system for the Municipality of Pililla.

7. RECOMMENDATIONS

Based on the findings and conclusions of the study, the following recommendations are proposed:

1. Integrate leptospirosis prevention into the Local Disaster Risk Reduction and Management Plan to ensure health-related hazards are recognized as priority risks in municipal disaster planning, alongside typhoons and flooding.
2. Improve drainage systems, waterways, and flood control structures in flood-prone barangays, particularly in Imatong, Takungan, and Wawa, to reduce the frequency and severity of flooding events.
3. Strengthen early warning systems and hazard communication mechanisms through SMS-based alerts, social media platforms, and barangay-based warning devices to ensure timely dissemination of hazard information to all residents.
4. Procure additional rescue boats, emergency vehicles, communication equipment, and medical supplies to enhance the response capacity of the MDRRMO and rescue teams, particularly for lakeshore and low-lying communities.
5. Conduct regular DRRM and health preparedness seminars, community simulation drills, and evacuation exercises in all barangays, with particular focus on leptospirosis prevention, flood safety, and proper sanitation practices.
6. Increase household preparedness by promoting emergency go-bags, first aid kits, and sanitation supplies, targeting an increase from 40% to at least 80% of households within two years.
7. Upgrade evacuation centers with adequate sanitation facilities, clean water supply, and medical support to prevent disease outbreaks, particularly leptospirosis and gastrointestinal illnesses, during disaster events.
8. Implement livelihood assistance and skills training programs for disaster-affected households, in partnership with TESDA, DA, DSWD, and NGOs, to support economic recovery and reduce long-term vulnerability.
9. Integrate medical assistance, psychosocial support, and leptospirosis monitoring into post-disaster recovery programs to address both physical and mental health needs of affected residents.
10. Strengthen partnerships with government agencies, NGOs, and private organizations for long-term

rehabilitation and recovery support, resource mobilization, and technical assistance.

11. Develop a comprehensive monitoring and evaluation mechanism for all DRRM programs, projects, and activities to assess effectiveness, identify gaps, and improve future interventions.
12. Promote sustainable environmental practices such as reforestation, waste management, and clean-up drives to reduce environmental degradation and minimize disaster risks.

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About the Author

Von Ryan Gajo is a dedicated public servant and disaster risk management professional committed to strengthening community resilience and public safety. He is currently pursuing a Master in Disaster Risk Management at Batangas State University – The National Engineering University, under the guidance of Dr. Nickie Boy A. Manalo, DBA, COMMS, as his Action Plan Adviser and Consultant.

Through this Action Plan, the author aims to contribute meaningfully toward strengthening disaster preparedness, response, rehabilitation, and recovery in the Municipality of Pililla, Rizal. The plan reflects extensive research, community engagement, and collaboration with local government officials, barangay representatives, MDRRMO personnel, and community members who shared their experiences, information, and insights during the conduct of this study.

The author firmly believes that this Action Plan is a meaningful contribution toward building a safer, more resilient, and disaster-prepared community for the people of Pililla, Rizal.

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