

Multi-Hazard Community Mitigation Action Plan: Addressing Earthquakes, Rain-Induced Landslides, and Respiratory Diseases from Volcanic Ashfall in Brgy. Pinamukan and Brgy. Simlong

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Abstract:

Batangas City's vulnerability on the Pacific Ring of Fire, exposed to a web of hazards that demand urgent, unified action. Seismic threats from faults like the Lubang Fault loom large, while steep terrains turn treacherous with rain-fueled landslides as seen in the aftermath of Typhoon Kristine in 2024. Taal Volcano adds another layer of peril, spewing ash laden with silica particles and sulfur dioxide that inflame respiratory woes. To confront this, the city's action plan paints a stark simulated scenario: a magnitude 7.2 earthquake sparks volcanic unrest, blankets the area in ashfall, and unleashes mudslides mixed with rain, choking evacuation routes and igniting health emergencies. This vision drives home the imperative for integrated planning, spotlighting local government units' pivotal roles, while narrowing focus to key hazards and barangays banking on community buy-in and steady funding.

Global and local risk breakdowns probe earthquake, landslide, and volcanic perils, informed by surveys unveiling low awareness, health risks, exposures, and readiness shortfalls. Consequences cascade: damaged buildings, economic hits, social chaos. SWOC spotlights CDRRMO strengths and awareness gaps, with training opportunities amid climate and multi-hazard threats. PESTEL layers in political, economic, social, tech, environmental, and legal dynamics.

Aligned to DRRM's four pillars, goals propel action. Prevention/mitigation rolls out campaigns, early warnings, and livelihood pivots (e.g., fisherfolk skills), backed by 2026 DRRM funds and PPAs. Preparedness drills BDRRMCs, maps hazards, and crafts household plans. Response stockpiles supplies,

loops feedback, and seals MOAs. Recovery rebuilds infrastructure, distributes PPE, deploys cash-for-work, and bolsters health. Matrices detail targets, outputs, timelines, budgets.

Monitoring tracks PPAs via indicators like awareness gains, sourced from surveys/logs, reviewed quarterly/bi-annually by CDRMO/BDRMCs. Resources ensure thematic progress, forging enduring resilience.

This roadmap transforms Batangas' risks into safeguards, merging vision with vigor to protect communities.

Keywords — Multi-Hazard Community Mitigation Action Plan: Addressing Earthquakes, Rain-Induced Landslides, and Respiratory Diseases from Volcanic Ashfall in Brgy. Pinamukan and Brgy. Simlong

I. INTRODUCTION

The entire Philippines sits on the Pacific Ring of Fire, establishing a constant, foundational risk of severe earthquakes due to its numerous major fault lines. This seismic activity is not an isolated threat, but one that is critically amplified by the country's prevalent hydro-meteorological hazards. Specifically, the frequent tropical cyclones and the regular heavy rains of the southwest monsoon interact dangerously with the area's mountainous terrain.

This interaction can produce a high-risk cascading hazard scenario: a strong tremor can loosen soil on slopes, creating tension cracks that allow rainwater to infiltrate the ground easily, directly priming the environment for a subsequent, destructive rain-induced landslide. Batangas is intimately linked to its position within one of the world's most geologically dynamic regions, necessitating an urgent and integrated approach to disaster risk reduction.

This synergistic threat is not theoretical; the tragic fatalities and extensive damage caused by the combined effects of flooding and landslides during Severe Tropical Storm Kristine in October 2024 in the Batangas province served as a clear, recent example of the area's acute vulnerability.

Henceforth, considering the above conditions the possibility of occurring hitting earth quake during tropical depression can loosen the soil on slopes, creating tension cracks. These cracks allow rainwater to infiltrate the ground more easily, increasing the risk of a rain-induced-landslide (PHIVOLCS 2024).

Seeing the present hazards to its extent the likelihood of multi-hazard scenario including respiratory illness due to Volcanic Ashfall can also be triggered. As of 2025, the volcano has continued to show signs of unrest, with PHIVOLCS reporting phreatic eruptions and high sulfur dioxide emissions throughout the year. Volcanic ash consists of small particles and crystalline silica, which can infiltrate the lungs deeply, resulting in respiratory illnesses like asthma, bronchitis, and various other lung-related conditions. (Horwell & Baxter, 2006). Gases released by volcanoes, including sulfur dioxide (SO₂) and hydrogen sulfide (H₂S), can irritate the airways, provoke asthma episodes, and result in chronic respiratory issues, particularly among at-risk groups such as children, the elderly, and those with existing respiratory ailments. (Hansell & Oppenheimer, 2004).

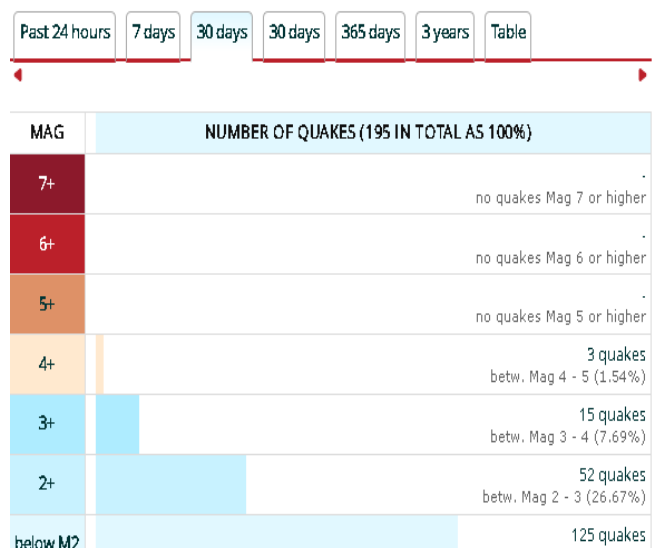
This interconnected reality where a geological event (earthquake) worsens a weather event (landslide) and a separate geological event (volcanic activity)

creates a health crisis (respiratory illness) is the core rationale for this Action Plan. Therefore, the "Multi-Hazard Community Mitigation Action Plan: Addressing Earthquakes, Rain-Induced Landslides, and Respiratory Diseases from Volcanic Ashfall in Brgy. Pinamukan and Brgy. Simlong" is not just a comprehensive list of risks, but a vital program aimed at holistically assessing the vulnerabilities and exposure to these compound hazards.

Henceforth, the action plan will review present documentations and provide a comprehensive analysis utilizing the four thematic areas of Disaster Risk Reduction Management (DRRM) that will be beneficial towards both Local Government Unit (LGU) and residents in the Community.

By analyzing how these specific hazards are interconnected, the plan will enable the Local Government Unit (LGU), healthcare professionals, and residents to contribute to Pre-Disaster Budgeting and Planning, implement enhanced training for Emergency Response Teams (ERTs), and develop robust preparedness, early recovery, and rehabilitation strategies, ultimately fostering community resilience against the full spectrum of Batangas City's interconnected natural threats.

The core strength of this action plan lies in its comprehensive integration of the four thematic areas of Disaster Risk Reduction and Management (DRRM) to specifically address the unique and interconnected multi-hazards facing Batangas City. This is far more than a simple set of guidelines; it is a structured, strategic framework detailing concrete interventions aimed at significantly minimizing the cascading effects of earthquakes, landslides, and respiratory illnesses caused by volcanic ashfall.



Number of Quakes In or Near Batangas, Calabarzon Philippines by Magnitude

1. SITUATIONAL ANALYSIS

Global Analysis

In view to pose threats of the natural hazards the global community are continuously striving to secure programs and controls that could aid humanity on suffering. Earthquakes, Rain-Induced Landslides, and Respiratory Diseases due to Volcanic Ashfall reveals three interconnected natural hazards that pose significant, often compounding, threats worldwide.

Earthquakes and rainfall are the dominant triggers for landslides, with a major seismic event leaving slopes unstable and vastly increasing the area's susceptibility to subsequent rain-induced landslides (RILs) for years afterwards. This interaction turns what might have been a localized disaster into a prolonged, cascading hazard, particularly in tectonically active, mountainous, and high-precipitation zones. Separately, volcanic ashfall and its associated gases pose an acute respiratory health risk. The inhalation of fine particulate matter (PM10 and PM2.5) and volcanic

smog (vog—formed from gases like SO₂) causes immediate irritation and exacerbates pre-existing conditions like asthma and COPD. The long-term hazard includes the risk of silicosis from prolonged exposure to ash with high crystalline silica content.

Crucially, in many vulnerable regions, these hazards overlap: earthquakes can induce landslides and occur near active volcanoes. A holistic global perspective must therefore address these compound disaster scenarios, where seismic damage, slope instability, and atmospheric pollution combine to overwhelm infrastructure and public health systems, leading to a high prevalence of acute respiratory infections and long-term lung diseases in affected populations.

Local Analysis

The areas encircling Barangays Pinamukan and Simlong in Batangas City, Philippines, confront a complex profile of natural hazards, including Earthquakes, Rain-Induced Landslides, and the health risks from Volcanic Ashfall. This high susceptibility is primarily driven by the city's location within the highly seismic and volcanically active Calabarzon region, proximal to the Taal Volcano and several active fault systems. A thorough analysis of the local context within these barangays is crucial for effective hazard mitigation and bolstering community resilience, especially considering the potential for one hazard to trigger another in a dangerous cascading effect.

Batangas City and the wider province are intrinsically linked to the Philippine Mobile Belt, which accounts for its high seismic activity and regular, albeit mostly minor to moderate, earthquakes. The true danger, however, lies in the potential influence of major structures like the Lubang Fault and the regional Macolod Corridor, which pose the threat of a major, destructive

earthquake. Pinamukan and Simlong face significant risks from seismic hazards, notably intense ground shaking and liquefaction in areas with susceptible, water-saturated soils. History underscores this danger, with recent quakes in the magnitude 5.1 to 6.5 range demonstrating the capacity to inflict substantial structural damage and cause widespread ground failure. Consequently, the tectonic setting mandates unwavering, strict adherence to modern building codes and proactive, ongoing seismic vulnerability assessments for all local infrastructure and housing within the barangays.

Compounding the seismic risk is the considerable threat of rain-induced landslides. Batangas province is generally characterized by high landslide susceptibility, a consequence of its terrain's steepness, specific geological and soil characteristics, and the frequent inundation from heavy rainfall and typhoons. The slopes in or around Pinamukan and Simlong are particularly vulnerable. Landslides are most often triggered when prolonged, intense precipitation saturates the ground, exceeding the soil's strength. A critical concern is the dangerous synergy between seismic activity and heavy rain: even moderate ground shaking can loosen and weaken soil and rock on slopes, leaving them primed for catastrophic failure once they become waterlogged. This risk is acutely elevated in areas where past human activity, such as inappropriate excavation, vegetation removal, or improper drainage, has further compromised natural slope stability. Given the proximity of residential and commercial establishments to susceptible slopes in Pinamukan and Simlong, the imperative is clear: localized, detailed landslide susceptibility mapping must be conducted, and robust land-use planning regulations must be strictly enforced to prohibit development in the highest-risk zones.

Henceforth, the primary geological threat emanating from the atmosphere is volcanic ashfall, sourced from the highly volatile Taal Volcano—one of the Philippines' most active and dangerous located in Taal Lake. Although Pinamukan and Simlong are not immediately on the lakeshore, the major eruption in 2020 served as a critical reminder of the volcano's potential for wide-ranging ash dispersal that can easily blanket Batangas City and its environs. Volcanic ash is not harmless soot; it is composed of fine, abrasive fragments of rock, mineral, and volcanic glass that can travel hundreds of kilometers and constitute a serious public health hazard, even if the layer deposited is relatively thin (PHIVOLCS 2020).

The most severe and immediate public health consequence of ashfall is the sharp rise in respiratory diseases. Inhaling the fine, crystalline ash particles leads to immediate irritation of the eyes, nose, and throat. Crucially, it can severely trigger or worsen pre-existing chronic conditions such as asthma, bronchitis, and emphysema. Instances of mass exposure, which are highly likely during the chaotic evacuation and prolonged stay in densely populated evacuation centers, can lead to a significant surge in cases of Acute Respiratory Infection. This was severely evidenced after the 2020 Taal eruption, where local health systems recorded thousands of respiratory-related illnesses among the affected population.

It is vital to recognize that children and the elderly are the most vulnerable populations in an ashfall event. Beyond serious respiratory issues, exposure can also result in minor but widespread public health concerns, including irritant-related conjunctivitis (eye inflammation) and minor skin problems. Therefore, the implementation of comprehensive, preemptive health protocols is a non-negotiable component of local emergency

planning in Pinamukan and Simlong. These protocols must include the efficient and widespread distribution of protective N95 masks, the rapid establishment of mobile health clinics to serve affected communities, and a high state of readiness for rapid response capability in treating respiratory ailments. This persistent risk requires continuous monitoring of Taal's activity by PHIVOLCS and fostering a perpetual state of community preparedness for the inevitable threat of future eruptions.

The merging of high seismic potential, severe rain-induced landslide susceptibility, and the atmospheric hazard from Taal's ashfall creates a multi-hazard environment that is structurally complex and requires a holistic disaster risk reduction strategy. For the barangays of Pinamukan and Simlong, effective governance and public safety hinge on integrated planning that accounts for the potential of these hazards to occur simultaneously or sequentially, magnifying the overall disaster impact.

Research Design

To give a comprehensive understanding of the multi-hazard scenario and to identify viable solutions to address the problem, the research design chosen for this study combined descriptive and exploratory methods and documentary analysis.

The descriptive method was employed to collect data regarding the prevalence of earthquake, rain-induced landslide and respiratory diseases due to volcanic ashfall in Brgy Pinamukan and Brgy. Simlong, Batangas City. This procedure aims to enhance the current programs, control measures, and resources that are in place. Surveys were conducted to gather general information data, assess awareness of hazards and their effects on community safety and health, as well as to evaluate local government unit preparedness and safety measures regarding these hazards were asked in the forms.

This data provided the author a baseline understanding of the current state and made it possible to determine any service gaps that could be addressed in the action plan.

The data collected from surveys directly informed the exploratory phase of this research design, which involved further investigation and analysis to identify potential solutions and interventions. The findings from the descriptive phase led to a site visit that delved deeper into the potential strategies to mitigate the impact to the affected community during disaster for Brgy. Pinamukan and Brgy. Simlong in Batangas City.

In the exploratory phase, site visits were conducted to observe the existing projects, protocols/policies, resources and facilities available in the Barangay for disaster preparedness and mitigation. The site visits provided a firsthand understanding of the challenges and opportunities present in the community, helping to identify potential plans, programs, and activities (PPAs) that could support the implementation of the action plan.

In addition to surveys and interviews, the action plan employed documentary analysis to support and validate the data gathered from primary sources. This approach entailed a thorough examination of pertinent documents relating to earthquake, landslide, and respiratory illnesses caused by volcanic ashfall disaster preparedness, public safety, and health, especially within the local contexts of Brgy. Pinamukan and Brgy. Simlong.

The analysis included official documents such as the Contingency Plan, DROMIC reports, City Health Office reports, PHIVOLCS hazard maps and warnings, as well as prior incident reports from the City Disaster Risk Reduction and Management Office (CDRRMO).

Ethical Considerations

In consideration of ethical standards, the researcher obtained prior approval of the collection of data from the target respondents. The researcher also received approval from ~~the~~ Barangay in which the study and survey were conducted following ethical principles. All information was discussed both verbally and written to state that the data collected ~~was~~ was treated with utmost confidentiality and was only used for the research purposes of the study. All participating respondents were also given the opportunity to withdraw from the study at any time without any obligation or liability. Participants are also not required to state any reason for the withdrawal. Additionally, all respondents are treated with integrity and fairness during the survey and interview. The material was translated into Filipino to enable easy comprehension from the responders who have difficulty understanding English. Finally, the respondents were assured that the data and all their information will be treated with confidentiality according to RA10173 or the Data Privacy Act of 2012.

PESTEL ANALYSIS

As part of the comprehensive action planning process, a PESTEL analysis was conducted to assess the external factors that could impact the implementation of the action plan. This analysis considered political, economic, social, technological, environmental, and legal factors that could influence the success of the initiative.

POLITICAL

Local Government Unit (LGU) play a significant role in strengthening community disaster resilience because local government actions directly influence preparedness, response, and recovery. Authorities ensure that residents receive timely and

accurate information about hazards, evacuation procedures, and safety measures, which increases public awareness and readiness. The enforcement of disaster-related guidelines such as evacuation protocols, infrastructure standards, and risk-reduction policies also helps maintain order and reduce vulnerability during emergencies.

Furthermore, the government's provision of financial assistance supports families in recovering more quickly after disasters, especially those with limited resources. However, uncertainties remain regarding the fairness, speed, and transparency of aid distribution. These concerns suggest the need for improved monitoring and clearer protocols to ensure that support reaches those who need it most.

ECONOMIC

The community faces notable challenges because many families rely on a single source of income, making them more vulnerable when disasters disrupt work and halt earnings. Limited financial buffers mean that even short-term interruptions can create long-lasting economic strain. Frequent disasters further intensify these hardships, as recovery often requires time, resources, and support that may not always be immediately available.

However, there are also positive economic factors that can support greater stability. The presence of reliable evacuation infrastructure helps minimize property damage and reduces the time needed to resume work after emergencies. Additionally, opportunities for livelihood diversification such as skills training, small-enterprise development, or agricultural support present pathways for families to build stronger economic resilience. Promoting these initiatives could significantly reduce vulnerability and improve long-term financial security.

SOCIAL

The community reveal a generally strong foundation for disaster readiness, driven by high levels of awareness about natural hazards and a clear understanding of what actions to take during emergencies. Many households demonstrate solid preparedness by maintaining emergency kits, knowing evacuation sites, and having communication plans, which collectively reduce panic and improve coordinated responses. Health resilience is another positive aspect, as families report being well-informed about health risks such as respiratory issues from volcanic ash and benefit from active health insurance coverage that supports medical needs during crises.

However, these strengths are counterbalanced by notable areas for improvement. Community participation in disaster preparedness programs remains relatively low, limiting the collective capacity to respond effectively. Additionally, concerns about relocation pressures reflect deeper social anxieties triggered by repeated disasters, potentially affecting community cohesion. Addressing these gaps through increased engagement and supportive community programs can further enhance overall resilience.

TECHNOLOGICAL

The community's disaster preparedness highlights important strengths, particularly the presence of functional Early Warning Devices (EWDs) that provide timely alerts and allow residents to act quickly during emergencies. Community members also demonstrate awareness of what different alarm signals mean, which increases the effectiveness of these warning systems.

These technological tools play a crucial role in reducing risk and improving safety by giving people

the time needed to evacuate or prepare. Henceforth, upgrading or putting in a strategical location of environmental and structural monitoring tools, including rainfall sensors or seismic detectors, would strengthen early detection capabilities. Such advancements would significantly boost the community's overall preparedness and resilience.

ENVIRONMENT

The public is exposed to a range of natural hazards, including earthquakes, landslides, heavy rainfall, and volcanic ash, making it inherently vulnerable to disaster events. These hazards pose risks not only to life and property but also to health, livelihoods, and long-term community stability. Despite this vulnerability, the presence of sturdy evacuation centers, wide and accessible roads, and well-maintained routes provides crucial mitigation measures, allowing residents to respond more safely and efficiently during emergencies. Such infrastructure helps reduce potential casualties and damage while supporting smoother evacuation processes. However, survey results indicate a degree of uncertainty among residents regarding landslide safety, reflecting gaps in awareness or understanding of hazard-specific risks.

This highlights the need for enhanced environmental education programs, hazard mapping, and community drills focused on landslide-prone areas. Improving knowledge and preparedness in this area would strengthen the community's resilience and reduce environmental risk exposure.

LEGALS

Legally, the community benefits from well-established disaster regulations and the proper implementation of emergency protocols, which help maintain safety, order, and accountability during calamities. Clear rules regarding evacuation

procedures, the maintenance of Early Warning Devices, and the operation of evacuation centers provide a structured framework that guides both authorities and residents in times of crisis. These legal measures ensure that emergency responses are coordinated, reducing confusion and enhancing overall preparedness. However, the survey indicates that some residents remain uncertain about the fairness, efficiency, and transparency of aid distribution.

This suggests gaps in the legal frameworks or their enforcement regarding relief operations. Strengthening laws and policies that govern the equitable allocation of financial and material assistance, coupled with clear monitoring mechanisms, could improve trust in institutions and ensure that aid reaches those most in need during disasters.

Legal frameworks had also governed the distribution of humanitarian aid and financial assistance. Government agencies and private organizations providing relief efforts had been required to comply with transparency and accountability regulations. The financial aid programs, such as the Emergency Loan Assistance (GSIS/SSS) and the Department of Social Welfare and Development (DSWD) cash aid programs, had been administered based on legal eligibility criteria, ensuring fair distribution to affected residents.

Analyzing these factors offers valuable insights into the impacts of multi-hazards, including earthquakes, rain-induced landslides, and respiratory illnesses from volcanic ash. This assessment identifies strengths, areas needing improvement, and potential enhancements. The resulting action plan provides strategic recommendations to improve public awareness, preparedness, and disaster response in Brgy. Pinamukan and Brgy. Simlong, Batangas City.

SWOC ANALYSIS

The SWOC (Strengths, Weaknesses, Opportunities, and Challenges) analysis provides a comprehensive framework to evaluate efforts on raising awareness and promoting safety measures in multi hazards such as earthquake, rain-induced landslides and respiratory diseases due to volcanic ashfall. This action plan focuses on key areas such as organization and management, decision support systems, risk management, communication strategies, resource allocation, innovation and technology, workplace health and safety policies, and budgeting. By examining these critical aspects, the analysis offers valuable insights into the effectiveness of the response efforts in the local context.

The following key areas had been identified in the SWOC analysis for the Brgy. Pinamukan and Brgy. Simlong of Batangas City.

Strengths

- Residents demonstrate strong understanding of natural hazards such as earthquakes, landslides, and volcanic eruptions. They are well-informed about warning signals and know what actions to take during emergencies.
- Respondents agree that they receive adequate information and guidance from authorities, especially regarding regulations and procedures during emergencies.
- Functioning Early Warning Devices, accessible evacuation roads, sturdy evacuation shelters, and sufficient sanitation facilities contribute to a well-established emergency setup.
- Families know their nearest evacuation sites, maintain emergency kits, and have reliable

communication plans, indicating readiness at the household level.

- Families feel resilient to illness during disasters, have active health insurance, and receive government financial assistance—factors that enhance their capacity to recover.
- Respondents express confidence that their homes can withstand minor earthquake damage, adding to their sense of safety.

Weaknesses

- Respondents show neutral perceptions of landslide risks, reflecting either low awareness or mixed experiences regarding hazards caused by heavy rainfall.
- Neutral responses regarding prioritization of the most affected individuals and satisfaction with government or private aid show possible gaps in support systems and trust.
- Families show uncertainty about rapid recovery after evacuation and lack diverse income sources, indicating potential financial fragility during prolonged crises.
- Neutral responses suggest challenges in basic needs access during emergencies, which may hinder recovery efforts.

Opportunities

- Increasing participation in local preparedness trainings and drills can boost overall community resilience and close the engagement gap.
- Providing targeted information about rainfall-induced landslides can eliminate uncertainty and help residents prepare more effectively.
- Addressing unclear perceptions about assistance from government and private sectors could enhance trust and satisfaction.

Streamlined, transparent relief operations may improve overall disaster response.

- Programs promoting multiple income sources can strengthen families' financial stability and speed up post-disaster recovery.
- While current infrastructure is good, focusing on improved space, sanitation, and evacuation routes can optimize safety and comfort.

Challenges

- The community remains vulnerable to earthquakes, landslides, volcanic ash, and heavy rainfall, requiring continuous preparedness efforts.
- Disasters significantly affect work continuity, posing long-term economic challenges especially for households with limited resources.
- Threats such as ashfall increase illness risk and can strain local health resources during severe events
- Since disasters influence decisions to relocate, population shifts may challenge social stability and local development planning.
- Issues related to market access, water contamination, or insufficient aid may hinder recovery and worsen hardship in future disaster events.

2. GOALS AND OBJECTIVES

This chapter presents the overall goals and objectives of the action plan. This outlines the goals of this action plan to enhance prevention, preparedness, response, mitigation, rehabilitation, and recovery efforts for the improvement of Brgy. Pinamukan and Brgy. Simlong in Batangas City.

Goal 1 Enhance the resilience of Brgy. Pinamukan and Brgy. Simlong through effective disaster prevention and mitigation strategies to reduce the impact of natural hazards on the community.

Objectives:

- 1.1 To increase community awareness of earthquake, rain-induced landslide, and volcanic ashfall risks through targeted education and training within 12 months.
- 1.2 Strengthen early warning systems and evacuation infrastructure by improving the functionality of devices, expanding accessible evacuation routes, and upgrading shelters as part of the BDRRM Plan.
- 1.3 Promote sustainable livelihood programs to diversify income sources, reducing financial vulnerability and supporting faster recovery following disaster events over the next 2 years.

PPA Matrix: Goal 1- Objective 1.1

Outcome: Increasing community awareness of risks from earthquakes, landslides, and volcanic ash respiratory illness, enhances preparedness: resulting in fewer casualties and less property damage during disasters.

The Programs, Projects and Activities (PPAs) include to develop and distribute educational materials (flyers, posters, brochures) on earthquakes, landslides, volcanic ash respiratory effects

Empower School and Community for Risk Mapping

PPA Matrix: Goal 1- Objective 1.2

Outcome: Resilience audits of shelters strengthen structural integrity, ensuring functionality of warning devices during hazards, and enhancing community confidence in evacuation sites.

The Programs, Projects and Activities (PPAs) include to conduct assessment and preventive maintenance of existing early warning devices (sirens, sensors, alarms) functionality and gaps. Maintain the Early Warning Devices in Good Condition.

Conduct shelter needs assessment and resilience audit. To have regular update and checking of the evacuation facilities and equipment

PPA Matrix: Goal 1- Objective 1.3

Outcome: Broadened livelihood opportunities increase household economic security, contributing to reduced poverty and strengthened community disaster preparedness.

The Programs, Projects and Activities (PPAs) includes Provide fishing gear, aquaculture training, and capacity building for fisherfolk.

Train coastal communities in alternative livelihoods like handicrafts, eco-tourism, and food processing. This reduces financial vulnerability and supports quicker recovery following disaster events.

Goal 2: Organize inclusive capacity-building sessions for youth, elderly, and disabled to strengthen BDRRMC planning and disaster readiness efforts.

Objectives:

2.1 To establish and regularly train a functional Barangay Disaster Risk Reduction and Management Committee (BDRRMC) with clear roles and responsibilities within 6 months.

2.2 To develop, implement, and continuously update a comprehensive community disaster preparedness plan including hazard mapping, evacuation protocols, and communication strategies.

2.3 Establish and regularly update household level of emergency plans including communication strategies, evacuation site awareness, and emergency kit maintenance reaching 90% of household within 12 months.

PPA Matrix: Goal 2- Objective 2.1

Outcome: Organize inclusive capacity-building sessions for youth, elderly, and disabled to strengthen BDRRMC planning and disaster readiness efforts.

The Programs, Projects and Activities (PPAs) includes organize capacity-building and engagement sessions targeting youth, elderly, and persons with disabilities for inclusive planning.

Train youth volunteers in disaster preparedness, first aid, and community mobilization to assist BDRRMC

This activity is for the Youth and Vulnerable Groups Engagement, which aims to foster inclusivity in community planning initiatives

PPA Matrix: Goal 2- Objective 2.2

Outcome: Disaster preparedness strengthens through accessible, updated knowledge hubs offering continual training, information sharing, and community feedback, supporting continuous learning and improvement.

The Programs, Projects and Activities (PPAs) includes formulation of evacuation protocols and routes in coordination with community and local stakeholders through workshop and seminars

Create physical and online knowledge hubs for ongoing training, information dissemination, and feedback

This supports ongoing capacity-building and knowledge sharing, reinforcing community

resilience through accessible learning platforms. Together, all PPAs integrate practical planning and educational outreach to strengthen local disaster management capabilities.

PPA Matrix: Goal 2- Objective 2.3

Outcome: Strengthened collective resilience and reduced harm through consistent practice, familiarity with evacuation sites, communication strategies, and maintenance of emergency supplies at the household level.

The Programs, Projects and Activities (PPAs) includes to Identify and provide tailored assistance for elderly, disabled, and low-income households to develop and maintain emergency plans and kits.

Use SMS, social media, and local community radio/public warning address to remind households to update emergency plans and emergency kit maintenance.

Goal 3: Ensure a rapid, coordinated, and efficient disaster response to protect lives and properties in Brgy. Pinamukan and Brgy. Simlong during emergencies.

Objectives:

3.1 Stockpile essential emergency supplies (food, water, medical kits) at strategic locations with a monitoring system for inventory every 3 months.

3.2 Design and implement a community feedback mechanism post-disaster to assess effectiveness of response and identify improvement areas.

3.3 Strengthen partnership with local government units, NGOs, and volunteer groups to support disaster response efforts, establishing at least three Memorandums of Agreement (MOAs).

PPA Matrix: Goal 3- Objective 3.1

Outcome: Increased efficiency and speed of disaster response operations due to clear Standard Operating Procedures (SOPs) and trained personnel for stockpile management and rapid deployment.

The Programs, Projects and Activities (PPAs) includes the Development SOPs and conduct training for rapid deployment of stockpiled supplies during emergencies.

Procure essential supplies sufficient for 72+ hours of disaster response covering estimated population

Together, these PPAs strengthen disaster preparedness by ensuring both clear deployment protocols and adequate supply readiness to support affected communities promptly and efficiently.

PPA Matrix: Goal 3- Objective 3.2

Outcome: Increased community engagement and trust through regular public forums where feedback results are openly discussed, encouraging shared responsibility and active participation in disaster risk reduction efforts and continuous improvement.

The Programs, Projects and Activities (PPAs) includes the implementation of SMS and QR Code-based real-time feedback channels for rapid community reporting and response evaluation.

Organize regular forums where community feedback outcomes and improvement actions are shared with residents

These programs empower communities by both providing accessible channels for input and ensuring that feedback leads to tangible enhancements in disaster preparedness and response.

PPA Matrix: Goal 3- Objective 3.3 Outcome:

Stronger partnerships boost community resilience by enabling timely life-saving actions, reducing

property damage, protecting vulnerable groups, and fostering ongoing collaboration.

The Programs, Projects and Activities (PPAs) includes the Establish partnerships with local businesses for emergency supply donations, logistics, and volunteer support.

Conduct joint trainings and multi-stakeholder simulation exercises to enhance coordination and operational efficiency

This program highlights the importance of leveraging local business networks to reinforce emergency preparedness and response capabilities. Through these collaborative exercises, the program seeks to refine response protocols and foster stronger partnerships, ensuring a more unified and effective disaster management approach within the community.

Goal 4: Promote community resilience in Brgy. Pinamukan and Brgy. Simlong through integrated rehabilitation and recovery efforts that incorporate disaster risk reduction measures.

PPA Matrix: Goal 4- Objective 4.1 Outcome: Enhanced management and sustainability of evacuation centers through organized Barangay Disaster Risk Reduction and Management Committees (BDRRMC) and clear operational protocols, ensuring the facilities remain ready and effective long-term.

The Programs, Projects and Activities (PPAs) includes the Training of local builders, barangay officials, and volunteers on resilient construction and repair standards.

Assess and retrofit existing structures to meet current resilient design standards for disaster preparedness and climate adaptation.

Together, these projects prioritize both capacity-building and physical improvements to reduce vulnerabilities and ensure that community

facilities are better prepared to withstand disasters and climate impacts.

PPA Matrix: Goal 4- Objective 4.2 Outcome: Enhanced community health resilience to prevent and manage disaster-related illnesses, reducing respiratory and other disease impacts, supporting full recovery and well-being within 12 months post-disaster.

The Programs, Projects and Activities (PPAs) includes the Procure and distribute PPE (masks, gloves, face shields, gowns) for health workers, volunteers, and vulnerable groups

Train health workers and community volunteers on proper PPE use, disposal, and infection prevention protocols.

These projects create a framework for protecting health workers and volunteers through provision and education.

PPA Matrix: Goal 4- Objective 4.3 Outcome: Improved economic resilience via diverse livelihoods, better social protection, insurance access, and risk management, fostering faster, stable community recovery within 18 months.

The Programs, Projects and Activities (PPAs) includes the Implementation of CFW programs for community rehabilitation tasks providing immediate cash income; Provide food subsidies to affected households

Provide conditional cash grants or material subsidies for housing repair using resilient materials compliant with national standards.

Together, these programs represent a comprehensive approach to post-disaster recovery, combining immediate relief with long-term

resilience through financial aid and infrastructure improvement.

3. MONITORING AND EVALUATION

Monitoring and evaluation of the programs, projects, and activities (PPAs) assigned to the goals and objectives of this action plan serves as a systematic framework to assess the implementation process, track progress, and evaluates the effectiveness of each PPA to ensure that they meet their intended objectives and contribute to the overarching goal of reducing the effects of the multi-hazards such as earthquake, rain-induced landslides and respiratory diseases due to ashfall. The chapter highlights establishing precise, verifiable indicators as success benchmarks, while pinpointing key assumptions and risks that may affect execution and results. It also identifies the critical assumptions and potential risks that could impact the implementation and outcomes of the PPAs. A detailed explanation of the data collection methods is included to ensure that reliable and accurate information is gathered, which forms the basis for sound decision-making and strategic adjustments.

Additionally, the timeframe for each activity is clearly defined, providing a timeline to monitor progress and milestones. The budget and sources of funding are also detailed to promote financial transparency and sustainability. This structured and comprehensive approach ensures accountability at every stage of the action plan, enabling stakeholders to identify challenges and implement timely corrective measures. Moreover, it supports continuous improvement by fostering a culture of learning and adaptation, ultimately enhancing the local governments efforts to improve public safety and health outcomes.

REFERENCES

- [1] Hansell, A., & Oppenheimer, C. (2004). Health hazards from volcanic gases: A systematic literature review. *Archives of Environmental Health*, 59(12), 628-639.
- [2] Horwell, C. J., & Baxter, P. (2006). The respiratory health hazards of volcanic ash: A review for volcanic risk mitigation. *Bulletin of Volcanology*, 69(1), 1–24. <https://doi.org/10.1007/s00445-006-0052-y>
- [3] Philippine Institute of Volcanology and Seismology (PHIVOLCS). (n.d.). *Volcanoes of the Philippines*. Department of Science and Technology <https://www.volcanodiscovery.com/place/1150/earthquakes/batangas/stats.html>
- [4] Philippine Institute of Volcanology and Seismology. (n.d.). *Volcanic ashfall hazards from Taal Volcano to Batangas City: 2020 eruption impacts on Pinamukan and Simlong*. <https://www.phivolcs.dost.gov.ph>
- [5] Philippine Institute of Volcanology and Seismology (PHIVOLCS). (n.d.). *Volcanoes of the Philippines*. Department of Science and Technology <https://www.phivolcs.dost.gov.ph/index.php/earthquake/introduction-to-earthquake>
- [6] Philippine Institute of Volcanology and Seismology. (2024). *Cascading hazards in Batangas Province: Earthquake-induced landslides and impacts of Severe Tropical Storm Kristine*. <https://www.phivolcs.dost.gov.ph>

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Trainings/ Workshops/ Seminars

- 2025: Camp Coordination and Camp Management (CDRRMO)
- 2025: Family Disaster Management (CDRRMO)
- 2024: Basic Incident Command Management (CDRRMO)
- 2018: Loss Control Management (48HRS)
- 2017: Basic Occupational Safety and Health (40HRS)
- 2017: Constuction Occupational Safety and Health