ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

Proactive and Reactive Disaster Response Mechanisms of Masbate City Airport (Moises R. Espinosa Airport)

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Date Submitted:
April 21, 2026

Date Accepted:
May 14, 2026

Date Published:
July 09, 2026

DOI:
10.5281/zenodo.21280646

ABSTRACT

This study examined the proactive and reactive disaster response mechanisms of Masbate City Airport, also known as Moises R. Espinosa Airport, during typhoon-related incidents from 2020 to 2025. It focused on how public administration strengthens disaster risk reduction through preparedness, emergency response, recovery, coordination, and operational resilience. The study employed a qualitative descriptive research design with a phenomenological approach. Five key airport personnel from Airport Management, Air Traffic Services, Air Navigation Services, Aerodrome Rescue and Firefighting, and Civil Security Intelligence were purposively selected because of their direct involvement in disaster preparedness, response, and recovery. Data were gathered through semi-structured interviews and were analyzed using thematic analysis. Findings revealed three proactive themes: anticipatory planning and risk-based preparedness, protection of critical assets and airport facilities, and centralized coordination for disaster preparedness. Reactive procedures were reflected in five themes: safety-centered emergency response, adaptive operations and service continuity, continuous and coordinated communication, immediate rescue and life-safety response, and coordinated recovery and operational resumption. The study also identified major challenges involving resource and communication limitations, coordination and manpower gaps during prolonged emergencies, and physical hazards with limited response capacity. The study concludes that Masbate City Airport has established practical disaster mechanisms, but their effectiveness depends on reliable communication, adequate personnel, updated equipment, inter-unit coordination, and management-level decision-making. A strategic action plan is recommended to strengthen the airport's disaster preparedness and resilience during future typhoon emergencies.

Keywords: *airport disaster response, disaster risk reduction, Masbate City Airport, public administration, reactive procedures, typhoon preparedness*

INTRODUCTION

Disaster risk reduction is a major public administration concern because disasters require coordinated policy implementation, institutional preparedness, operational decision-making, and recovery management. Public institutions are expected to plan, organize, and coordinate resources before, during, and after hazard events. In this context, public administration does not operate only as a bureaucratic function; it becomes a practical system for protecting lives, sustaining public services, and restoring critical operations. Disaster management has increasingly shifted from a purely reactive response model to a broader approach that includes prevention, preparedness, mitigation, emergency response, and long-term recovery (Durrant et al., 2022; Kaya & Akbulut, 2022).

In the Philippines, disaster risk reduction is especially important because of the country's repeated exposure to typhoons and other natural hazards. Republic Act No. 10121 institutionalized the country's disaster risk

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
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reduction and management system through a comprehensive and decentralized approach that highlights prevention, preparedness, response, recovery, and rehabilitation. This legal and governance framework requires government agencies and local institutions to coordinate their actions before and during emergencies. In practice, the strength of disaster response depends not only on national policy but also on how frontline institutions implement preparedness and recovery mechanisms in local settings (Distor, 2025; Raikes et al., 2021).

Critical infrastructures such as airports are particularly important during disasters because they support the movement of relief goods, emergency personnel, medical supplies, and public services. When typhoons affect road and sea routes, airport facilities can become important logistical hubs for response and recovery. However, airports are also vulnerable to flight disruptions, flooding, debris, communication failure, equipment damage, and personnel limitations. These conditions make airport disaster risk reduction a significant area of inquiry within public administration and critical infrastructure resilience (Ishiwatari, 2021; Yang et al., 2023).

Masbate City Airport, also known as Moises R. Espinosa Airport, serves as the central air transport facility of Masbate Province. Because Masbate is located in a region frequently affected by typhoons, the airport must maintain preparedness, response, and recovery procedures that protect personnel, passengers, aircraft, facilities, communication systems, and operational continuity. Despite the importance of airports in disaster logistics, limited local studies have examined how airport authorities implement proactive and reactive disaster mechanisms at the administrative and operational levels.

This study therefore assessed the proactive and reactive disaster response mechanisms of Masbate City Airport during typhoons from 2020 to 2025. Specifically, it examined the proactive measures of the airport before typhoon impact, the reactive procedures implemented during and after typhoon events, and the challenges encountered by airport authorities in implementing disaster risk reduction strategies. The findings are intended to support the development of a strategic action plan for strengthening disaster preparedness, coordination, communication, manpower readiness, and operational resilience at the airport.

Literature Review

Public administration, governance, and disaster risk reduction

Public administration provides the organizational foundation for disaster risk reduction because it links policy, planning, coordination, and service delivery. Wilson (1887) emphasized that administration translates public purpose into organized action, while contemporary disaster governance literature explains that institutional values such as transparency, accountability, responsiveness, and efficiency are necessary for effective disaster management (Durrant et al., 2022). In the Philippine context, Brillantes and Lorenzo (2023) highlighted governance values such as economy, efficiency, effectiveness, ethics, equity, and accountability, which are relevant when public institutions manage disaster preparedness and response.

Good governance theory strengthens this view by emphasizing that disaster response requires accountable decision-making, coordination, resource use, and public trust. Klitgaard (1991) associated governance with the ability of institutions to create practical systems that support efficient and responsible action. In disaster settings, these governance principles appear in the form of clear command structures, transparent advisories, timely coordination, and responsible use of limited resources. For airport operations, governance quality becomes visible in how management coordinates specialized units and makes safety-centered decisions during typhoon threats.

Institutional capacity is also central to disaster risk reduction. North (1990) argued that institutions shape performance through rules, resources, routines, and organizational arrangements. Cvetković et al. (2021) similarly emphasized that capacity development improves preparedness, resilience, and disaster response within local governance systems. In airport disaster management, institutional capacity includes the availability of trained personnel, functioning communication systems, backup power, rescue equipment, role clarity, and coordination mechanisms that allow airport units to respond under difficult conditions.

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Airport disaster preparedness and critical infrastructure resilience

Airports are critical infrastructures because they connect communities, support emergency logistics, and contribute to continuity of public services. Herqutanto et al. (2022) emphasized that airport disaster preparedness requires systematic planning, inter-agency coordination, training, and operational readiness. Sun et al. (2025) also highlighted the value of structured airport emergency response evaluation models because airports must assess readiness, coordinate response functions, and improve emergency decision-making. These studies indicate that airport preparedness is not limited to technical aviation procedures but also includes administrative coordination and institutional planning.

Airport resilience depends on the ability of facilities, personnel, and systems to remain functional or recover quickly during disruptions. Taiwo et al. (2024) explained that emergency response performance is shaped by infrastructure, procedures, staff competence, coordination, and situational awareness. Zhu et al. (2025) emphasized the importance of firefighting resilience and resource allocation in airport emergency situations. These perspectives are relevant to the role of Aerodrome Rescue and Firefighting units, Air Navigation Services, and airport management in preparing rescue equipment, protecting technical systems, and ensuring safety before and after typhoon impact.

Climate-related hazards create additional pressure on airport resilience. Voskaki et al. (2023) noted that climate hazards increasingly affect airport systems through disruptions to infrastructure and operations. Wang (2023) further explained that airport capacity management during disaster response requires balancing safety, transportation demand, emergency logistics, and infrastructure limitations. These insights show that airports must adopt both proactive and reactive strategies that address not only immediate safety but also service continuity and operational recovery.

Coordination, recovery, and operational challenges in disaster response

Coordination is a persistent requirement in disaster management because multiple offices and agencies must act under time pressure and uncertain conditions. Ishiwatari (2021) emphasized the importance of coordination between national and local government institutions, while Gooding et al. (2022) showed that partnerships strengthen emergency preparedness and response. Amil (2025) similarly described collaborative governance as a mechanism for improving communication, resource mobilization, and decision-making during disasters. In airport settings, coordination must occur both vertically with external agencies and horizontally among airport units.

Post-disaster recovery is a staged and resource-sensitive process. Ali and Mannakkara (2024) explained that recovery is affected by coordination challenges, institutional constraints, and limited resources. Mantzana et al. (2020) also noted that airport crisis management involves multiple stakeholders and can be weakened by communication barriers or unclear institutional roles. These points are important in understanding how an airport moves from immediate response to damage assessment, system testing, debris clearing, facility inspection, and safe operational resumption.

Philippine studies and related works also highlight the importance of training, resource planning, and logistical support in disaster operations. Brucal et al. (2020) emphasized the value of emergency financing and resource planning in improving local disaster response. Gatinao (2024) showed that humanitarian assistance and disaster response depend on infrastructure, personnel training, and inter-agency coordination, while Servito (2023) emphasized simulation drills, continuous training, and clear emergency procedures among air traffic personnel. These studies support the present inquiry into how Masbate City Airport can strengthen preparedness, response, and recovery during typhoon-related disruptions.

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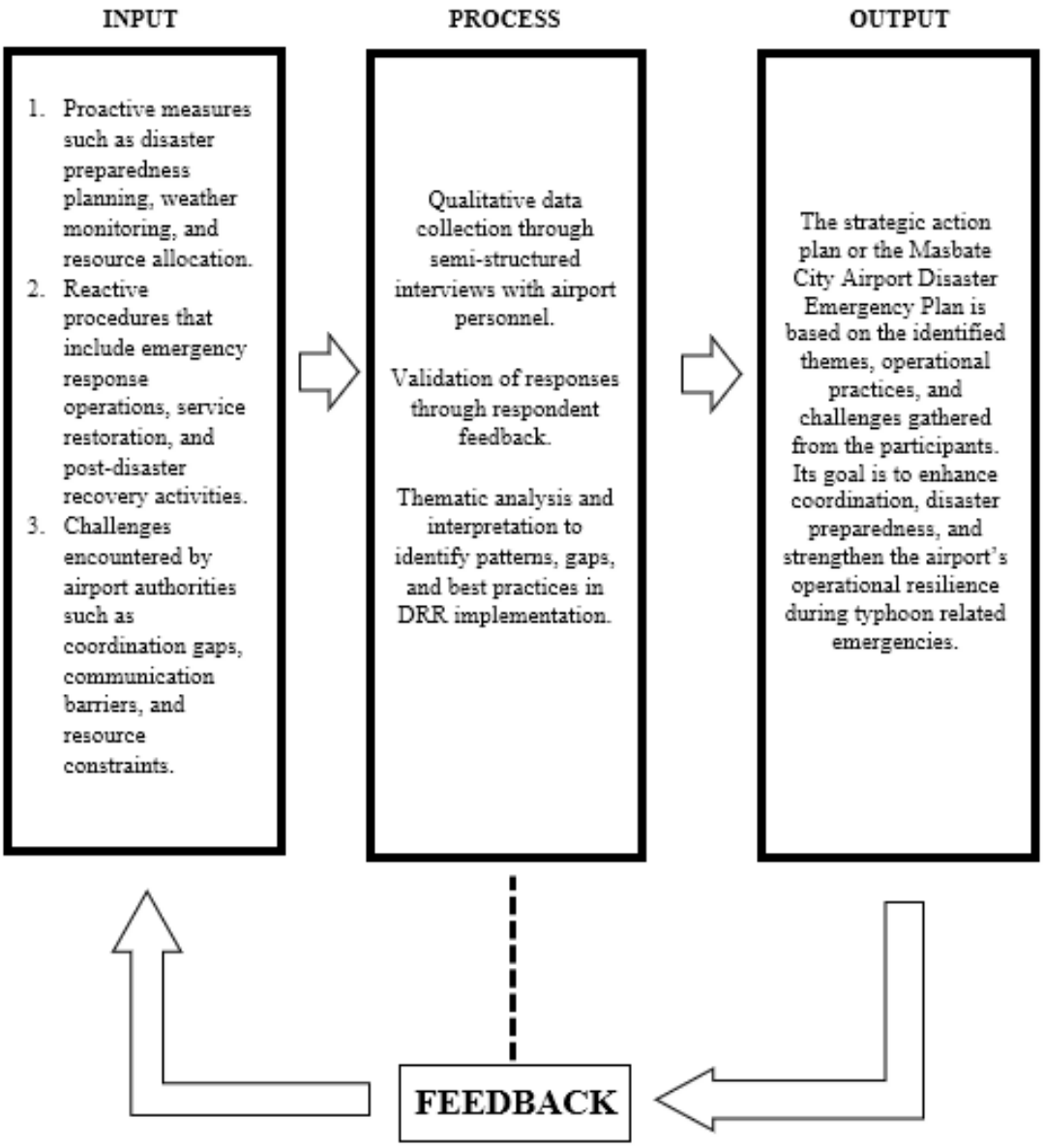

Figure 1. *Conceptual Paradigm*

METHODS

Research Design

The study employed a qualitative descriptive research design with a phenomenological approach. The qualitative descriptive design was appropriate because the study sought to present a clear and practical description of the actual disaster preparedness, response, and recovery mechanisms implemented at Masbate City Airport. This design allowed the researcher to document the experiences and operational practices of airport personnel in their real institutional setting (Turale, 2020).

The phenomenological approach was used to understand the lived experiences and meanings assigned by airport personnel to disaster risk reduction during typhoon-related events. Phenomenology was appropriate

ISSN: 3116-3475
International Journal
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because the study focused on how selected airport personnel perceived and experienced proactive measures, reactive procedures, and operational challenges in disaster preparedness, response, and recovery (Creswell & Poth, 2018).

Research Locale

The study was conducted at Masbate City Airport, also known as Moises R. Espinosa Airport, located in Masbate City, Masbate Province, Philippines. The airport serves as the province's central air transport hub and supports the movement of passengers, cargo, government services, and emergency assistance. It was selected because of its strategic role in disaster response and its exposure to typhoon-related disruptions in the Bicol Region.

Participants and Sampling Technique

Purposive sampling was used to select key informants with direct knowledge of disaster preparedness, response, and recovery operations at Masbate City Airport. This sampling approach was appropriate because qualitative research requires participants who can provide rich and relevant information about the phenomenon being examined (Campbell et al., 2020). The final sample consisted of five participants, which is consistent with phenomenological research that prioritizes depth of understanding over numerical size and may reach meaningful data saturation with a small group of knowledgeable participants (Vasileiou et al., 2020).

Table 1. *Participants of the Study*

Participant Unit	Operational Role in Disaster Risk Reduction
Airport Management	Central coordination, activation of emergency response plans, resource allocation, damage assessment, and operational resumption decisions.
Air Traffic Services (ATS)	Weather monitoring, air traffic safety assessment, advisories, NOTAM issuance, flight suspension, diversion support, and coordination with airlines.
Air Navigation Services (ANS)	Inspection, protection, testing, deactivation, repair, and restoration of communication, navigation, backup power, and technical systems.
Aerodrome Rescue and Firefighting (ARFF)	Rescue readiness, firefighting and life-safety response, evacuation assistance, debris removal, and safety inspection of affected areas.
Civil Security Intelligence (CSI)	Surveillance, access control, protection of records and facilities, security coordination, and monitoring during emergency and recovery operations.

Research Instrument

The primary research instrument was a semi-structured interview guide. The guide contained questions on proactive measures, reactive procedures, and challenges encountered by airport personnel in implementing disaster risk reduction strategies during typhoon-related emergencies. Semi-structured interviews were suitable because they provided a consistent inquiry framework while allowing participants to describe their experiences in detail (Adeoye-Olatunde & Olenik, 2021; Karatsareas, 2022). The interview guide underwent content validation by experts in public administration and disaster management.

Data Gathering Procedure

After the approval of the research proposal, the researcher secured formal permission from the appropriate airport authority to conduct the study. The selected participants were contacted and interviewed at a convenient schedule. The interviews were conducted face-to-face within the airport premises, lasted approximately 20 to 30 minutes, and were audio-recorded with participant consent. The recordings were labeled, securely stored, transcribed, and reviewed together with field notes and a reflective journal.

Data Analysis

The interview data were analyzed through thematic analysis. The process included transcription, familiarization with the data, preliminary coding, grouping of codes into themes, theme review, interpretation, and presentation of findings. This method was appropriate because thematic analysis allows the researcher to identify patterns, shared meanings, and variations in participant experiences (Braun & Clarke, 2021; Kushnir, 2025).

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Ethical Consideration

Ethical principles were observed throughout the study. Participants were informed of the purpose of the research, the voluntary nature of their participation, their right to withdraw, and the confidentiality of their responses. Consent was obtained before the interviews and before audio recording. The identities of participants were protected by referring to them according to their unit roles rather than personal names, and the data were used solely for academic research purposes.

RESULTS AND DISCUSSION

Proactive Measures of Masbate City Airport During Typhoons

The first research question examined the proactive measures implemented by Masbate City Airport before and during the expected arrival of typhoons. Three emergent themes were identified: anticipatory planning and risk-based preparedness, protection of critical assets and airport facilities, and centralized coordination for disaster preparedness. These themes show that preparedness is distributed across different airport units while being integrated through airport management.

Anticipatory planning and risk-based preparedness were reflected in weather monitoring, early advisory dissemination, contingency planning, and technical readiness. Air Traffic Services monitored meteorological aerodrome reports and PAGASA updates, while Air Navigation Services checked navigation aids, communication equipment, generators, and emergency power supplies before typhoon impact. These actions show how administrative systems transform disaster information into operational readiness, which reflects Wilson's (1887) view that administration organizes public action in response to public needs. The finding also supports Herqutanto et al. (2022), who emphasized the importance of structured airport disaster preparedness and inter-agency coordination.

Protection of critical assets and airport facilities was another proactive mechanism. Civil Security Intelligence focused on surveillance, access control, strengthening of entry points, and securing records, while Aerodrome Rescue and Firefighting prepared fire trucks, rescue equipment, fuel reserves, radios, and emergency tools in safe but accessible locations. This finding demonstrates that asset protection is not merely physical preparation; it is also a governance responsibility connected with accountability, security, and continuity of service (Klitgaard, 1991; Zhu et al., 2025).

Centralized coordination for disaster preparedness was evident in the role of Airport Management as the overall coordinating body. The Airport Manager aligned the actions of airport units, coordinated with airlines and external agencies, and made preparedness decisions based on the situation. This arrangement reflects a distributed yet coordinated administrative model, where specialized units perform technical roles and management provides overall direction. This supports the importance of institutional coordination in disaster management (Gooding et al., 2022; Ishiwatari, 2021).

Reactive Procedures of Masbate City Airport During Typhoons

The second research question focused on the reactive procedures of Masbate City Airport during typhoons. Five emergent themes were identified: safety-centered emergency response, adaptive operations and service continuity, continuous and coordinated communication, immediate rescue and life-safety response, and coordinated recovery and operational resumption. These procedures show that the airport responds to typhoons by prioritizing life safety, protecting operational systems, sustaining communication, conducting rescue-related tasks, and gradually restoring airport operations.

Safety-centered emergency response was reflected in the immediate assessment of whether air traffic could still be safely handled. Air Traffic Services evaluated weather conditions, supported aircraft diversion when necessary, issued NOTAMs, and recommended flight suspension when safety could no longer be assured. Airport Management similarly prioritized minimizing harm to personnel and facilities. This finding supports Wang's (2023) view that airport disaster response requires balancing transportation needs, emergency functions, and aviation safety under infrastructure limitations.

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Adaptive operations and service continuity were primarily shown in the work of Air Navigation Services. The unit monitored communication and navigation systems, deactivated vulnerable equipment when needed, used backup generators, performed repairs, and tested systems before declaring them operational. This finding illustrates institutional capacity because continuity depends on trained personnel, backup systems, equipment condition, and available spare parts (North, 1990).

Continuous and coordinated communication was reflected in NOTAM issuance, airline advisories, security coordination, radio communication, and direct coordination among units. The findings show that communication is not a secondary activity during typhoons but a core disaster governance function. However, the data also revealed that communication breakdowns can weaken security confirmation, unit coordination, authorization control, and operational decision-making, which is consistent with Mantzana et al. (2020).

Immediate rescue and life-safety response was largely associated with ARFF. The unit placed operations on full alert, prepared for possible aircraft accidents, fire, flooding, rescue needs, evacuation, debris removal, and structural safety concerns. This finding indicates that ARFF links immediate response with early recovery because it protects life, clears hazards, and assesses affected areas before normal activity can resume. The importance of personnel skills, equipment readiness, and situational awareness is consistent with Taiwo et al. (2024).

Coordinated recovery and operational resumption involved damage assessment, restoration of utilities, coordination of repairs, debris clearing, inspection of facilities, communication with airlines, and decision-making on reopening. Recovery was shown to be a phased administrative process rather than a single action. It requires ATS, ANS, ARFF, CSI, and Airport Management to contribute according to their functions. This supports Ali and Mannakkara's (2024) view that post-disaster recovery is affected by sequencing, coordination, institutional limits, and resource availability.

Challenges Encountered in Implementing Disaster Risk Reduction Strategies

The third research question examined the challenges encountered by airport authorities in implementing disaster risk reduction strategies. Three emergent themes were identified: resource and communication limitations, coordination and manpower gaps during prolonged emergencies, and physical hazards and limited response capacity. These challenges show that Masbate City Airport has existing disaster mechanisms, but their implementation is affected by operational and institutional constraints.

Resource and communication limitations were reflected in limited equipment, insufficient backup systems, dependence on timely weather updates, aging technical systems, limited spare parts, and budget constraints. These limitations affect not only technical recovery but also administrative decision-making. For example, delayed communication and incomplete weather information can affect decisions on suspension, diversion, reopening, and coordination. This supports Yang et al. (2023), who emphasized that infrastructure weaknesses affect disaster response, and Brucal et al. (2020), who highlighted the importance of emergency financing and resource planning.

Coordination and manpower gaps during prolonged emergencies were also identified. Participants noted that the number of personnel may become insufficient when typhoons last longer or when personnel themselves are affected by the disaster. Communication failure can also slow coordination among management, security, rescue, air traffic, and navigation units. This finding shows that capacity development must include not only general training but also backup staffing, role assignments, and continuity arrangements during extended emergencies (Cvetković et al., 2021).

Physical hazards and limited response capacity were reflected in flooding, debris, unsafe conditions, limited mobility, and insufficient advanced rescue equipment. These hazards can delay movement, affect vehicle positioning, restrict rescue operations, and slow clearing and recovery activities. The result is consistent with Voskaki et al. (2023), who noted that climate hazards increasingly affect airport infrastructure and operations. However, the finding should be interpreted within the qualitative scope of the study: the participants described operational effects, but the study did not conduct a technical engineering assessment of flood defenses or structural systems.

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Table 2. *Summary of Emergent Themes*

Research Focus	Emergent Themes	Meaning for Airport Disaster Risk Reduction
Proactive measures	Anticipatory planning and risk-based preparedness; protection of critical assets and facilities; centralized coordination for disaster preparedness.	Preparedness depends on weather monitoring, technical inspection, equipment protection, security readiness, and management-level coordination before typhoon impact.
Reactive procedures	Safety-centered emergency response; adaptive operations and service continuity; continuous and coordinated communication; immediate rescue and life-safety response; coordinated recovery and operational resumption.	Response and recovery depend on flight safety decisions, system protection, communication, rescue readiness, debris and damage assessment, and phased operational resumption.
Implementation challenges	Resource and communication limitations; coordination and manpower gaps during prolonged emergencies; physical hazards and limited response capacity.	Disaster mechanisms are weakened by limited equipment, backup systems, spare parts, manpower, communication reliability, flood conditions, debris, and rescue resources.

Proposed Strategic Action Plan

Based on the findings, a strategic action plan is proposed to strengthen the Masbate City Airport Disaster Emergency Plan. The plan focuses on preparedness coordination, asset protection, communication reliability, manpower readiness, and recovery procedures. It is intended for validation by airport management and relevant stakeholders before institutional adoption.

Table 3. *Proposed Strategic Action Plan for Strengthening Airport Disaster Preparedness and Recovery*

Key Area	Recommended Action	Expected Output
Preparedness coordination	Conduct regular pre-typhoon coordination meetings among Airport Management, ATS, ANS, ARFF, CSI, PAGASA, airlines, and relevant response agencies.	Faster decision-making, clearer role assignment, and improved readiness before typhoon impact.
Critical asset protection	Standardize procedures for securing navigation aids, communication devices, fire and rescue equipment, documents, surveillance systems, fuel reserves, and access points.	Reduced damage to critical airport assets and improved service continuity after typhoons.
Communication reliability	Strengthen backup communication systems, emergency power supplies, radio procedures, and continuity protocols for inter-unit and external coordination.	More reliable communication during flight suspension, emergency response, damage assessment, and recovery.
Manpower readiness	Implement periodic disaster drills, simulation exercises, duty rotation plans, and backup staffing arrangements for prolonged typhoon emergencies.	Improved personnel readiness, clearer task execution, and reduced operational gaps during extended response periods.
Post-typhoon recovery	Develop clear protocols for damage assessment, debris clearing, facility inspection, system testing, stakeholder notification, and safe operational resumption.	More organized recovery, safer reopening decisions, and stronger operational resilience.

CONCLUSION

The study concludes that Masbate City Airport implements proactive disaster risk reduction mechanisms that help strengthen preparedness before typhoon-related emergencies. These include weather monitoring, risk-based planning, technical inspection, protection of critical facilities and equipment, and centralized coordination among airport units. These mechanisms show that disaster preparedness at the airport is carried out through both specialized unit responsibilities and management-level coordination.

The study also concludes that the airport's reactive procedures are mainly directed toward operational safety, service continuity, communication, rescue response, damage assessment, and phased recovery. The airport relies on the coordinated actions of ATS, ANS, ARFF, CSI, and Airport Management to protect personnel, aircraft, facilities, and essential systems during and after typhoon events. However, the effectiveness of these procedures depends on timely communication, reliable equipment, skilled personnel, and clear operational decisions.

Finally, the study concludes that Masbate City Airport continues to face important challenges in disaster risk reduction implementation. These include limited equipment and backup systems, communication difficulties, manpower shortages during prolonged emergencies, flooding, debris, unsafe conditions, and limited advanced rescue resources. These challenges do not negate the existence of disaster mechanisms; rather, they show areas where institutional support, resource allocation, coordination, and preparedness systems need to be strengthened.

Recommendation

Airport management should validate and adopt the proposed Masbate City Airport Disaster Emergency Plan or strategic action plan in coordination with relevant airport units, local government offices, disaster risk reduction and management offices, and aviation authorities. Validation is necessary to ensure that the plan aligns with existing policies, operational requirements, and actual local conditions.

Masbate City Airport should strengthen anticipatory planning and centralized coordination by conducting regular pre-typhoon meetings among Airport Management, ATS, ANS, ARFF, CSI, PAGASA, airlines, and other response partners. These meetings should clarify roles, communication protocols, resource availability, flight safety decisions, and recovery priorities before typhoon impact.

Airport authorities should improve the protection of critical facilities and equipment through standardized asset protection procedures, secure storage, periodic vulnerability checks, backup power systems, and maintenance plans for communication and navigation equipment. These steps may reduce operational disruption and shorten recovery time after typhoon events.

Inter-agency coordination should be strengthened through joint preparedness activities, simulation exercises, and communication drills involving local government units, DRRM offices, medical responders, law enforcement, and other emergency agencies. Stronger external coordination will help the airport function effectively as a critical logistics and emergency support facility.

Manpower readiness should be improved through periodic disaster response training, emergency drills, duty rotation systems, and contingency staffing arrangements. Future researchers may conduct similar studies in other regional airports or include engineering, passenger, airline, and cost-related perspectives to provide a broader understanding of airport disaster resilience.

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