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Strengthening Local Disaster Response in Aceh, North Sumatra, and Padang Through AQRF-Based Occupational Mapping: A Rapid Assessment Study

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Abstract
Purpose - Indonesia's vulnerability to disasters necessitates a more structured and competency-based approach to emergency response. This study investigates the application of the ASEAN Qualifications Reference Framework (AQRF) in occupational mapping for disaster management in three high-risk provinces: Aceh, North Sumatra, and Padang.
Design/methodology/approach - Using the Rapid Assessment Process (RAP), qualitative data were collected through interviews, document analysis, and field observations. The data were analyzed using the four functional areas of disaster management defined in the AQRF: preparedness, response, recovery, and mitigation.
Originality - his paper contributes to the growing discourse on professionalizing disaster response through structured competency frameworks. It offers localized insights for implementing regional frameworks like AQRF in decentralized disaster governance settings.
Findings and Discussion - The study identifies significant institutional gaps in disaster workforce planning, particularly the absence of defined occupational roles and certified competencies. AQRF-based occupational mapping provides a viable model to enhance clarity, coordination, and capacity development in local disaster management agencies.
Conclusion - AQRF-based occupational mapping holds significant potential to improve disaster management outcomes in Indonesia's most vulnerable provinces. Integrating this framework into local policies and training systems can lead to more resilient, responsive, and professionally managed emergency response structures.

Keywords - Emergency Response, Disaster Management, ASEAN, AQRF, Competency Standards, Indonesia, Occupational Mapping

Introduction

Indonesia, as an archipelagic state with over 17,000 islands, is uniquely situated along the Pacific Ring of Fire, exposing it to frequent and diverse natural hazards such as earthquakes, tsunamis, volcanic eruptions, landslides, and floods (Ramsi et al., 2025). This geographical vulnerability, coupled with rapid urbanization, uneven development, and high population density, places Indonesia among the most disaster-prone nations globally (BNPB, 2019).

Provinces such as Aceh, North Sumatra, and Padang (West Sumatra) are among the most affected by natural disasters. The 2004 Indian Ocean tsunami, which devastated Aceh and resulted in over 200,000 fatalities, is one of the deadliest in recorded history. Similarly, Padang has experienced repeated seismic events, such as the 2009 earthquake, while North Sumatra regularly suffers from floods and landslides (Chian et al., 2019; Septa et al., 2023) and recurrent flooding in North Sumatra (Sihite & Nusraningrum, 2025) continue to underscore the chronic vulnerability of these areas.

Although Indonesia has established significant institutional frameworks for disaster risk reduction—such as the National Disaster Management Agency (BNPB) and the provincial/district-level BPBDs—many gaps persist in actual emergency response operations. These include fragmented practices, lack of standard operating procedures, and absence of structured human resource systems. The lack of standardized occupational roles, competencies, and qualification frameworks in the disaster management sector impedes coordination, performance, and long-term resilience.

In response to these challenges, the Association of Southeast Asian Nations (ASEAN) introduced key frameworks, including the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) and the ASEAN Standardization and Certification for Experts in Disaster Management (ASCEND) (Ramsi et al., 2025). In parallel, the ASEAN Standardization and Certification for Experts in Disaster Management (ASCEND) (ASCEND, 2018, 2023) was introduced as a competency-based approach to certifying disaster professionals (Photo et al., n.d.). ASCEND sets forth regional standards for knowledge, skills, and attitudes required for various disaster-related roles, ranging from emergency logistics and health services to command-level coordination and humanitarian leadership. These initiatives aim to harmonize disaster response competencies across the region. Central to these efforts is the ASEAN Qualifications Reference Framework (AQRF), which offers a multi-level competency-based system that defines knowledge, skills, and responsibilities across occupational roles (Feldmann-jensen et al., 2015).

Against this regional backdrop, this study focuses on the implementation and relevance of AQRF-based occupational mapping in strengthening local disaster response capacity in three of Indonesia's most disaster-vulnerable provinces: Aceh, North Sumatra, and Padang (Ripoll Gallardo et al., 2015). Despite the availability of these regional frameworks, their localization and adoption within Indonesia's disaster governance remain limited. Most local disaster management agencies are unfamiliar with AQRF and ASCEND standards. This has resulted in unstandardized training, limited professional certification, and a lack of clarity in disaster workforce development (Napirah et al., 2023)

In Aceh, nearly two decades after the catastrophic 2004 tsunami (Marietta et al., 2004). North Sumatra, meanwhile, struggles with recurring floods and landslides in its upland and urban areas. The local disaster response systems often face coordination challenges, especially in the recovery phase (Shi, 2020). Post-disaster reconstruction is frequently delayed due to the absence of professional recovery specialists, engineers, and psychosocial

support teams whose roles are poorly defined within the local frameworks.

Padang, the capital of West Sumatra, presents a mixed case. As a city that has experienced multiple moderate-to-severe earthquakes, its residents are relatively aware of disaster risks (Chian et al., 2019; Septa et al., 2023). In sum, the AQRF and ASCEND frameworks present a significant opportunity to professionalize disaster response at both national and subnational levels. Their implementation in high-risk Indonesian provinces like Aceh, North Sumatra, and Padang is not merely a bureaucratic alignment exercise but a crucial step toward building resilient communities and saving lives. By contextualizing regional frameworks to local needs through occupational mapping, Indonesia can ensure that its frontline disaster responders are equipped, trained, and recognized for their critical roles.

This study seeks to explore how AQRF-based occupational mapping can be applied in three of Indonesia's most disaster-prone provinces—Aceh, North Sumatra, and Padang—to strengthen emergency response systems. The research aims to (1) map current disaster management occupational structures; (2) identify gaps in alignment with AQRF standards; and (3) propose actionable recommendations for integrating regional frameworks into local disaster governance. By doing so, the study contributes to the professionalization of Indonesia's disaster response system, bridging regional policy frameworks with local institutional practices through a competency-based approach

Literature Review

Disaster Management Policy Framework in Indonesia

Indonesia's disaster management system is grounded in Law No. 24 of 2007 on Disaster Management, which mandates the responsibilities of government, communities, businesses, and international actors in a collaborative model. This evolved into the Pentahelix approach, integrating five stakeholders: government, academia, private sector, community, and media (UU RI No. 24 Tahun 2007 Tentang Penanggulangan Bencana, 2007), There are three main pillars in disaster management, namely (1) the government, (2) the community, and (3) the business world and international institutions. It then evolved into five pillars known as pentahelix for disaster management by involving the participation of academics and mass media. These five pillars then carry out disaster risk management. The implementation of Disaster Management is based on Government Regulation of the Republic of Indonesia Number 21 of 2008, namely pre-disaster, during a disaster, and post disaster (PP RI No. 21 Tahun 2008 Tentang Penyelenggaraan Penanggulangan Bencana, 2008). Despite legal progress, actual implementation at the regional level remains uneven. Many provincial disaster management agencies (BPBDs) still operate without structured personnel management systems, standardized training, or formal recognition of professional competencies.

ASEAN Regional Framework: AADMEER, ASCEND, and AQRF

In response to increasing disaster risks, ASEAN initiated several frameworks to promote regional cooperation and standardization in disaster

response. The ASEAN Agreement on Disaster Management and Emergency Response (AADMER), effective since 2009, is a legally binding regional protocol emphasizing collective preparedness and rapid response (Ramsi et al., 2025).

Complementing AADMER, the ASEAN Qualifications Reference Framework (AQRF) and the ASEAN Standardization and Certification for Experts in Disaster Management (ASCEND) were established to standardize disaster-related occupations and competencies across member states (ASCEND, 2023). AQRF introduces eight competency levels, supporting role classification, workforce mobility, and alignment of qualifications across sectors. While these frameworks are robust at the conceptual level, their application at the national or subnational level remains inconsistent, especially in countries with decentralized governance like Indonesia.

Competency-Based Approaches in Disaster Management

Disaster response requires not only physical infrastructure but also competent human resources. According to Feldmann-Jensen et al. (2015), The absence of defined roles, required skills, and performance expectations often results in fragmented responses and poor coordination.

Competency-based frameworks—like those promoted in AQRF—can resolve these issues by:

1) Defining occupational roles across disaster phases (preparedness, response, recovery, mitigation).
2) Linking each role with specific knowledge, skills, and attitudes (KSAs).
3) Supporting structured recruitment, training, and evaluation

Such approaches are critical to professionalizing disaster response, especially in multi-agency and cross-border contexts

Institutional Gaps and Implementation Challenges in Indonesia

While Indonesia has participated in ASEAN initiatives, research shows that local implementation remains weak. Most BPBDs lack staff familiar with AQRF or ASCEND. There is also a lack of accredited training providers offering AQRF-aligned modules, limiting opportunities for formal certification (Napirah et al., 2023; Wangke, 2024). Studies by Surono & Saragih (2024) also highlight the mismatch between local training curricula and the actual occupational demands in disaster operations. Moreover, funding constraints, institutional inertia, and limited awareness further hinder the adoption of regional competency frameworks

Methods, Data, and Analysis

Research Design

This study adopted a Rapid Assessment Process (RAP), a qualitative research method suitable for time-sensitive and complex social environments (Beebe, 2001; Surono & Saragih, 2024; Wang et al., 2023). The RAP framework facilitated quick yet systematic insights into local disaster management systems (Mph & Moore, 2025). The method emphasizes triangulation, team-based fieldwork, and iterative data analysis. RAP was chosen due to its flexibility, participatory nature, and its ability to capture

both formal structures and informal practices within local disaster management systems.

Study Sites

The research was conducted in three high-risk Indonesian provinces:

1) Aceh: a post-tsunami recovery region with active community-based disaster risk reduction (CBDRR) initiatives.
2) North Sumatra: frequently affected by flooding and landslides, with limited coordination during recovery.
3) Padang (West Sumatra): a seismically active city with moderate disaster awareness but weak institutional standardization.

These sites were selected based on their recurring exposure to disaster events, strategic importance in Indonesia's disaster response system, and variation in institutional maturity

Data Collection

Multiple qualitative data sources were used:

1) Semi-structured interviews with key personnel from local disaster management agencies (BPBDs), local governments, and training institutions. A total of 18 informants were interviewed across the three provinces.
2) Document analysis of local disaster policies, institutional mandates, training curricula, and ASCEND/AQRF documentation.
3) Field observations during simulation drills and emergency preparedness exercises.

Interview question focus on:

1) Awareness and application of AQRF and ASCEND frameworks
2) Existing job roles and their clarity
3) Training and certification mechanisms
4) Challenges in disaster workforce planning.

Analytical Framework

Data were analyzed using a deductive thematic approach aligned with the four functional areas of disaster management defined in the ASEAN Qualifications Reference Framework (AQRF):

1) Preparedness
2) Response
3) Recovery
4) Mitigation and Prevention

Each function was examined in terms of:

1) Occupational role clarity
2) Alignment with AQRF competency levels
3) Training availability
4) Institutional integration

The coding process involved identifying recurring patterns, contradictions, and examples of best practices or gaps. NVivo software was used to assist with thematic categorization and memo writing.

Results

This section presents the findings from three disaster-prone provinces Aceh, North Sumatra, and Padang analyzed through the lens of the ASEAN Qualifications Reference Framework (AQRF). The results are organized along four functional domains of disaster management: preparedness, response, recovery, and mitigation. The section concludes with a gap analysis highlighting systemic misalignments between local practices and AQRF standards, followed by a critical discussion of institutional implications (ASCEND, 2023; Ripoll Gallardo et al., 2015).

Preparedness: Gap in Role Definition and Training

Disaster preparedness activities were relatively more visible in Aceh, particularly through community-based initiatives and regular simulation drills. However, these activities often lacked formal institutional support. Positions such as Disaster Information Officers and Early Warning Coordinators, while essential under AQRF, were either nonexistent or vaguely defined within BPBD structures. Staff members often operated without clear job descriptions or structured training. “We conduct regular simulations, but there's no formal training linked to job competencies or certification. Most of us learn on the job.” (Interview, BPBD Aceh, 2025).

These findings are consistent with Napirah et al. (2023) who noted the absence of structured preparedness roles and standardized training in local BPBDs across Indonesia. Without AQRF-aligned competencies, preparedness remains fragmented and overly reliant on informal knowledge transfer.

Response: Operational Confusion and Overlapping Duties

In all three provinces, the disaster response phase suffered from unclear task delegation and overlapping responsibilities. In Padang, roles such as Emergency Operations Center (EOC) Coordinators, Logistics Officers, and Rapid Assessment Teams were managed by general administrative personnel with no formal disaster training or certification.

These operational deficiencies mirror the findings of Feldmann-Jensen et al (2015), who emphasized that unclear role delineations in emergencies often lead to confusion, delays, and inefficiencies in life-saving interventions. Simulation drills in Padang further revealed coordination problems during joint responses, especially between civil agencies and security forces, due to the absence of common operational standards.

Recovery: Lack of Professionalized Post-Disaster Roles

The recovery function was found to be the least institutionalized across all sites. In North Sumatra, positions such as Social Recovery Coordinators and Public Infrastructure Rehabilitation Officers, as defined in AQRF, were not formally recognized. Recovery tasks were often added ad hoc to the responsibilities of unrelated staff, delaying reconstruction efforts and neglecting psychosocial support. “There’s no specific unit for community reintegration. Psychosocial support and infrastructure rehabilitation are treated as secondary concerns.” (Interview, North Sumatra, 2025).

This is consistent with Campbell-Arvai & Lindquist (2021) and Shi (2020) who found that the recovery phase is often overlooked due to poor institutional prioritization, despite its long-term impact on community resilience.

Mitigation: Awareness without Technical Capacity

Most local governments acknowledged the importance of disaster mitigation, including spatial planning and risk zoning. However, in Padang, technical roles such as Geospatial Analysts and Urban Risk Planners, which are essential under AQRF, were either outsourced or not filled. Hazard mapping existed but was rarely updated or used for land-use decisions.

This reflects the findings of Snyder & Gebhart (2016) and Wangke (2024), who identified a pattern in Southeast Asian local governments: policy awareness exists, but professional human resource systems are underdeveloped

Gap Analysis

The analysis across preparedness, response, recovery, and mitigation domains reveals four major systemic gaps:

1) Structural Role Ambiguity
   While AQRF outlines distinct disaster management roles across levels I to VIII (AQRF ASEAN, 2015), local agencies still rely on generalized administrative positions, leading to blurred lines of responsibility
2) Absence of Competency-Based Recruitment and Certification
   No formal alignment exists between job requirements and AQRF-defined competencies. Recruitment is still based on civil service status rather than technical expertise or certification (ASCEND, 2023; Napirah et al., 2023)
3) Inadequate Training and Certification Ecosystem
   There is a lack of local institutions offering AQRF-aligned, modular, and accredited training programs. Even national-level training centers under BNPB have yet to fully integrate AQRF frameworks (Surono & Saragih, 2024)
4) Disconnect Between Policy and Implementation
   Although disaster laws exist at the national level (UU RI No. 24 Tahun 2007 Tentang Penanggulangan Bencana, 2007) AQRF and ASCEND are not yet integrated into local BPBD organizational structures, HR systems, or career pathways (Mph & Moore, 2025; Ramsi et al., 2025).

Table 1. AQRF Standar

AQRF Standard (Expected)	Local Practice (Observed)	Gap Identified
Clearly defined roles by functional area and level	Vague and overlapping administrative roles	Structural ambiguity
Competency-based certification pathways	No formal training or certification for technical positions	Lack of professional development infrastructure
Modular training	One-size-fits-all or	Training

AQRF Standard (Expected)	Local Practice (Observed)	Gap Identified
aligned to qualification levels	outdated training modules	misalignment
Institutional integration of AQRF standards	Absence of AQRF roles in BPBD organizational charts	Policy-practice disconnect

Discussion

The study's findings confirm the relevance and urgency of institutionalizing AQRF-based occupational mapping within Indonesia's disaster management system. The framework's emphasis on defined roles, tiered competencies, and certified training can address longstanding institutional fragmentation, especially in high-risk regions.

However, as emphasized by Feldmann-Jensen et al. (2015) and ASCEND (2023), the utility of frameworks like AQRF depends on full integration into local governance mechanisms. The successful adoption of AQRF will require:

1) Policy Alignment: Embedding AQRF roles into BPBD structures and regional regulations.
2) Capacity Building: Establishing accredited provincial training centers offering AQRF-aligned certification.
3) Cross-Sector Partnerships: Collaborating with universities, NGOs, and the private sector to co-develop context-relevant training and recruitment systems (Surono & Saragih, 2024; Wangke, 2024)

Without these systemic changes, the promise of AQRF will remain largely theoretical, and Indonesia's local disaster response capacity will continue to face coordination and performance deficits during crises.

Conclusion

This study highlights significant institutional gaps in Indonesia's disaster management system, particularly in Aceh, North Sumatra, and Padang, where the absence of standardized occupational roles and competencies undermines the effectiveness of local emergency responses. While regional frameworks such as the ASEAN Qualifications Reference Framework (AQRF) and ASCEND offer structured models for professionalizing disaster response, their implementation at the subnational level remains limited and fragmented. The findings demonstrate that AQRF-based occupational mapping provides a viable solution to address structural ambiguities, improve coordination, and enhance human resource development in local disaster agencies. By aligning job roles with specific competency levels and certification standards, local governments can move beyond ad hoc responses toward a more resilient and professional disaster workforce. To realize this potential, three strategic actions are essential: (1) institutional integration of AQRF roles into BPBD structures and job descriptions; (2) development of localized, competency-based training and certification programs in collaboration with ASCEND and national bodies such as BNPB and BNSP; and (3) promotion of cross-sector partnerships involving academia,

NGOs, and the private sector to sustain long-term capacity building. Without these systemic reforms, Indonesia's disaster-prone regions will remain vulnerable to operational inefficiencies during future crises

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