Civil–Military Coordination in CBRN Response: A WOGOS Approach for ASEAN Resilience

Syed Fareez Syed Nasir[1]*, Ahmad Farhan Ahmad Fuad[1], Faridah Johari[2]

[1]Royal Medical and Dental Corp

[2]University of Geomatika Malaysia

***Corresponding Author**

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ABSTRACT

The evolving security landscape in Southeast Asia has elevated Chemical, Biological, Radiological and Nuclear (CBRN) threats as a critical challenge to regional stability and resilience. These threats, which include pandemics, industrial accidents and the potential misuse of hazardous materials, have demonstrated significant impacts on public health, national security and economic systems across ASEAN member states. This study aims to examine the role of civil–military coordination (CIMIC) in enhancing preparedness and response to CBRN threats within the ASEAN context. It further explores the application of a Whole-of-Government and Whole-of-Society (WOGOS) approach in strengthening both national and regional resilience. A qualitative research design was employed, utilising document analysis of policy frameworks, academic literature and regional reports related to CBRN response and civil–military coordination. The study identifies key components of effective CIMIC, including information sharing, interoperability, communication strategies and joint training exercises. Findings indicate that while ASEAN has established foundational platforms such as defence cooperation mechanisms and emergency response frameworks, significant challenges remain. These include institutional barriers, lack of standardised protocols, communication gaps and disparities in resources and capabilities among member states. The study also highlights the importance of integrating military capabilities with civilian expertise to achieve unity of effort and optimise resource utilisation during complex emergencies. The WOGOS approach is identified as a critical enabler of resilience by promoting inclusive participation and shared responsibility across sectors. In addition, case evidence from Malaysia demonstrates the effectiveness of coordinated civil–military mechanisms in managing health crises such as the COVID-19 pandemic. In conclusion, strengthening CIMIC and adopting a comprehensive WOGOS framework are essential for enhancing ASEAN's readiness and resilience against CBRN threats. The study recommends the development of a regional CBRN coordination framework, increased investment in capacity building and the adoption of advanced technologies to improve early warning and response systems.

Keywords: CBRN threats, civil–military coordination, ASEAN, resilience, Whole-of-Government and Whole-of-Society approach, health security

INTRODUCTION

The evolving security landscape in Southeast Asia has heightened the significance of Chemical, Biological, Radiological and Nuclear (CBRN) threats as a critical concern for regional stability. These threats are no longer confined to traditional warfare but increasingly manifest through pandemics, industrial accidents and potential misuse of hazardous materials. ASEAN member states, characterised by rapid development and interconnected societies, are particularly vulnerable to such multidimensional risks. Therefore, understanding the nature and scope of CBRN threats is essential for strengthening regional preparedness and resilience (Szklarski, 2024).

One of the most prominent CBRN threats in the region is the rising risk of biological hazards, particularly pandemics and emerging infectious diseases. The global experience with COVID-19 demonstrated how rapidly biological threats can overwhelm healthcare systems and disrupt national security frameworks. Countries within ASEAN faced significant challenges in managing transmission, resource allocation and public communication during the crisis. This highlights the urgent need for enhanced surveillance, early warning systems and coordinated response strategies to mitigate future biological threats (Budiman et al., 2023).

In addition to biological risks, increasing urbanisation and cross-border mobility further exacerbate the vulnerability of ASEAN nations to CBRN incidents. Dense urban populations create environments where chemical spills, radiological exposure or infectious diseases can spread rapidly with severe consequences. Moreover, the high volume of trade and travel across borders facilitates the transnational movement of hazardous materials and pathogens. As a result, regional interdependence necessitates stronger cross-border collaboration and integrated risk management approaches (Dawa & Singay, 2025).

CBRN threats also have far-reaching implications beyond public health, affecting economic stability, national security and social cohesion. Disruptions caused by such incidents can lead to economic losses, strain military and civilian resources, and erode public trust in government institutions. Addressing these complex challenges requires a multi-sectoral response involving military forces, public health agencies, private sectors and local communities. Consequently, adopting a comprehensive and coordinated approach is vital to effectively manage and mitigate the impacts of CBRN threats in the ASEAN region (Benolli et al., 2021).

OBJECTIVE

The primary objective of this study is to examine the role of civil–military coordination in enhancing preparedness and response to CBRN threats within the ASEAN region. The study aims to explore how integrated collaboration between military forces, public health authorities and civilian agencies can improve operational effectiveness during complex emergencies. It also seeks to assess the applicability of a Whole-of-Society approach in strengthening national and regional resilience against CBRN incidents. By focusing on ASEAN's unique geopolitical and socio-economic context, the study intends to provide a comprehensive understanding of coordinated response mechanisms.

In addition, this study aims to identify key challenges and gaps that hinder effective civil–military coordination in CBRN response across ASEAN member states. The research will evaluate existing frameworks, policies and practices to determine their effectiveness in addressing multidimensional threats. Furthermore, it seeks to propose strategic recommendations to enhance interoperability, capacity building and information sharing among stakeholders. Ultimately, the study aspires to contribute to the development of a more resilient and integrated approach to managing CBRN threats in the ASEAN region.

METHODOLOGY

This study adopts a qualitative research design to explore the role of civil–military coordination in responding to CBRN threats within the ASEAN context. A qualitative approach is appropriate as it enables an in-depth understanding of complex coordination mechanisms, institutional dynamics and strategic practices among stakeholders. The study utilises a combination of document analysis and expert insights to examine existing frameworks and operational experiences. This design allows for a comprehensive exploration of both theoretical perspectives and practical implementations of civil–military collaboration.

Data collection is conducted through the review of secondary sources, including policy documents, official reports, academic literature and regional frameworks related to CBRN response and civil–military coordination. Key documents from ASEAN platforms, national security policies and military medical guidelines are systematically analysed to identify recurring themes and best practices. In addition, purposive sampling may be applied to include relevant case studies, such as pandemic responses and national-level emergency operations. This approach ensures that the data reflects both regional trends and country-specific experiences.

LITERATURE REVIEW

Civil–Military Coordination (CIMIC)

CIMIC plays a pivotal role in disaster response and humanitarian operations as military organisations contribute critical operational capabilities including rapid deployment, advanced logistics infrastructure and well-defined command systems. Chaisorn (2022) highlights that CIMIC is among the most crucial factors for successful humanitarian assistance and disaster relief operations, emphasising its strategic value in crisis environments. Similarly, Jabbar and Makki (2021) illustrate this through Pakistan's military response to COVID-19, where forces effectively managed the crisis despite limited specialised health training, demonstrating inherent strengths in coordination and execution. These examples underscore the importance of well-structured CIMIC frameworks in maximising military operational advantages to achieve effective outcomes in complex emergencies.

Beyond operational capabilities, CIMIC significantly strengthens disaster and public health emergency responses by integrating complementary strengths across civil and military sectors, particularly in public health, governance and community engagement. Ries (2022) provides extensive evidence from 45 publications across 22 countries, identifying contributions ranging from prevention and diagnostics to logistics, vaccination support and crisis communication during the COVID-19 pandemic. Janse et al. (2022) further reinforce this by identifying eight distinct areas of cooperation across all phases of emergency management through a comprehensive scoping review. Collectively, these findings demonstrate that CIMIC is essential for developing resilient health systems capable of addressing multifaceted crises through coordinated multi-sectoral approaches.

CIMIC also serves as a critical enabler of operational success by promoting coordinated action between civilian and military stakeholders, thereby optimising resource utilisation and reducing inefficiencies. Toneva (2024) emphasises that CIMIC is fundamental to the success of military operations, particularly in complex and dynamic environments. Supporting this, Khorram-Manesh et al. (2022) found that civil–military collaboration effectively addresses all elements of surge capacity including personnel, resources, infrastructure and systems based on a survey of practitioners from multiple countries. This highlights CIMIC as a key mechanism for achieving unity of effort and enhancing overall operational effectiveness across diverse crisis scenarios.

Furthermore, CIMIC contributes to reducing duplication and improving response efficiency through structured collaboration and clearly defined institutional roles. Tene et al. (2022) emphasise that effective partnerships require formal agreements anchored within institutional frameworks and guided by four pillars which are collaboration, coordination, capacity building and evaluation. In parallel, Gad et al. (2021) identified a wide spectrum of civil–military cooperation activities across European countries during COVID-19, demonstrating the breadth of coordinated efforts supporting national health and public systems. Together, these insights confirm that structured CIMIC approaches enhance efficiency by aligning actions, minimising overlap and ensuring a more coherent and integrated emergency response.

Concept of Whole-of-Government and Whole-of-Society (WOGOS) Approach

The WOGOS approach represents a comprehensive collaborative framework that unites diverse stakeholders to address complex challenges through coordinated and integrated action. Dubb (2020) identifies civil society, business and government as the fundamental pillars of this model, emphasising that no single actor possesses the capacity to effectively manage dynamic and multifaceted crises independently. Wignjadiputro et al. (2020) illustrate this integration through Indonesia's pandemic preparedness exercise, which demonstrated strong civil–military interoperability alongside coordinated engagement among government agencies, health systems and community organisations. This reflects a strategic transition from fragmented and siloed responses toward a more unified and inclusive approach to crisis management.

Building on this foundation, the WOGOS approach plays a crucial role in enhancing collective preparedness and societal resilience across various crisis contexts. Ruggiero et al. (2024), through interviews with stakeholders from civil society, business and the public sector in Finland, present an exploratory model showing how interconnected systems and adaptive capacity contribute to resilience. Similarly, Wigell et al. (2021) highlight best practices from Finland, Sweden and Australia, demonstrating that WOGOS frameworks grounded in

societal resilience have gained prominence in policy development and are effective in addressing hybrid threats. These findings underscore the importance of leveraging diverse stakeholder capabilities and fostering systemic coordination to strengthen overall preparedness.

A central principle underpinning the WOGOS approach is the emphasis on shared responsibility in crisis response. Määttä (2021) identifies shared responsibility as a core component of the framework, reinforcing the idea that effective crisis management depends on collective ownership across sectors. This is further supported by Haghighat et al. (2023), who show that during the COVID-19 pandemic in Iran, the integration of WOGOS approaches required active collaboration between state and non-state actors. Together, these insights confirm that shared responsibility is fundamental to the effectiveness of the WOGOS approach in managing complex and evolving crises.

Key Components of Effective CIMIC in CBRN

Information sharing and intelligence integration are fundamental enablers of effective CIMIC in CBRN response, as they facilitate timely decision making and coordinated multi agency actions. Kegyes et al. (2024) emphasise the growing importance of information management in supporting modern CBRN defence technologies and decision support systems. Campioni et al. (2023) further highlight key challenges including secure information sharing, prioritisation of critical data and resource discovery, all of which require integrated solutions to enhance situational awareness across agencies. Collectively, these elements establish information management and intelligence integration as the foundation for effective civil military cooperation in complex CBRN incidents.

In addition to information systems, structured coordination frameworks are essential to ensure effective collaboration in CBRN environments. Ries (2022) demonstrates that successful CIMIC practices incorporate political alignment, strategic direction, organisational structures and clearly defined civil military interactions, with emphasis on capacity building and disaster communication. Farhat et al. (2024) further stress the importance of robust coordination mechanisms and a harmonised global approach to strengthen comprehensive emergency response strategies. As such, joint planning and standardised operating procedures remain critical pillars for achieving seamless integration, rapid response and efficient resource utilisation.

Interoperability across agencies and nations also plays a central role in ensuring effective CBRN response. Benolli et al. (2021) highlight that mitigating risks associated with CBRN threats requires strong coordination among national agencies and continuous development of interagency defence capabilities. Greaves and Porter (2021) reinforce this by emphasising the need for structured multi agency and multidisciplinary responses, particularly with medical support as a key component. These perspectives underscore that effective CBRN response depends on the ability of diverse actors to function as a unified and integrated system.

Effective communication further strengthens CIMIC by shaping public awareness and influencing behavioural responses during crises. Choudary et al. (2021) identify crisis communication as a critical component of CBRN management, requiring timely dissemination of information and specialised communication skills. Long and Majumdar (2025) demonstrate that transparent, empathetic and culturally sensitive communication enhances public trust and cooperation, which are essential for compliance during emergencies. Therefore, communication strategies must prioritise trust building through clear and context appropriate messaging to ensure effective public engagement.

Finally, training and joint exercises are vital for enhancing operational readiness and competency in CBRN response. Erickson et al. (2023) provide strong empirical evidence showing significant improvements in performance, with mean test scores increasing from 57.8% to 81.4% across 523 participants in 15 training courses and 90.7% of participants demonstrating measurable improvement. Similarly, Babacan (2023) confirms that targeted training significantly improves healthcare professionals' preparedness through measurable knowledge gains. These findings highlight that continuous training and realistic exercises are essential components for strengthening preparedness, improving coordination and ensuring effective operational outcomes in CBRN incidents.

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DISCUSSION

Challenges in Civil–Military Coordination

Institutional barriers and structural issues continue to impede effective civil–military coordination by limiting role clarity, compliance and organisational alignment among stakeholders. Wankmüller and Reiner (2021) identify challenges such as unclear division of responsibilities and noncompliance with established standards, which weaken coordination efforts. Janse et al. (2022) further highlight issues related to governance limitations, framework conditions and organisational cultural differences that create friction between actors. These findings suggest that persistent institutional weaknesses require systematic structural reforms to strengthen overall coordination effectiveness.

At the regional level, the absence of standardised protocols across ASEAN further complicates civil–military coordination by creating inconsistencies in planning and response approaches. Chaisorn (2022) emphasises the need for stronger national CIMIC frameworks to support humanitarian assistance and disaster relief operations within ASEAN. Cook and Yogendran (2020) demonstrate that existing ASEAN mechanisms reflect varying models of disaster partnership, indicating uneven coordination practices among member states. As a result, greater standardisation and consistent implementation of protocols are necessary to enhance regional coordination.

Communication gaps also represent a critical barrier to effective coordination, as they restrict information flow and reduce mutual understanding between civilian and military actors. Pačka and Mareš (2023) identify key challenges including power dynamics, budget constraints and the absence of clear political direction, all of which hinder effective communication. Kapucu and Hu (2022) further show how such gaps contribute to coordination failures during crisis response at higher levels of governance. These insights indicate that improving communication systems and strategies is essential for strengthening civil–military cooperation.

In addition, trust deficits and role ambiguity undermine coordination by creating uncertainty and reducing confidence among stakeholders. Santos and Siman (2024) highlight how political disputes and the expansion of military roles beyond traditional defence blur institutional boundaries and complicate cooperation. Janse et al. (2022) emphasise the importance of establishing domain consensus through clearly defined responsibilities to reduce operational friction. Without clear roles and mutual trust, civil–military partnerships are less effective in responding to emergencies.

Finally, disparities in resources and capabilities among ASEAN nations present further obstacles to coordinated response efforts. Luangphane et al. (2024) identify resource inequities, political sensitivities and coordination challenges as key factors affecting regional disaster response capacity. Cook and Yogendran (2020) also note the difficulty of managing partnerships across countries with varying levels of capability and institutional development. These disparities ultimately limit seamless coordination and reduce the effectiveness of collective humanitarian and disaster response operations.

ASEAN Perspective on CBRN Cooperation

The ADMM and ADMM Plus have proven to be ASEAN's highest defence consultative and cooperative mechanisms for addressing non-traditional security challenges, providing an important platform for enhancing collaboration among member states' defence establishments. Silalahi (2023) highlights their role in fostering dialogue and strengthening regional security coordination, while ASEAN's broader emergency response framework is guided by the principle of One Vision One Identity One Community and operationalised through the One ASEAN One Response approach. Djalante et al. (2020) emphasise that despite these frameworks, effective cross border coordination remains essential, particularly in managing pandemics and complex regional crises. Together, these platforms offer a strong institutional foundation for CBRN cooperation, although their overall effectiveness depends on improving coordination mechanisms and reducing delays in initial response.

Despite these advancements, ASEAN continues to face notable gaps in regional CBRN coordination that require more structured and systematic frameworks. Castriciones and Vijayan (2020) identify significant biosecurity

vulnerabilities across Southeast Asia and recommend comprehensive initiatives focused on awareness building, standardised training and multi stakeholder engagement. Similarly, Trajano and Caballero-Anthony (2020) stress the importance of institutionalising nuclear security cooperation through regional action plans, capacity building efforts and strengthened emergency preparedness networks involving ASEAN and wider Asia Pacific partners. These findings highlight the need for ASEAN to prioritise integrated regional frameworks that address both immediate security gaps and long-term institutional capacity development.

In response, ASEAN has increasingly focused on enhancing information sharing and capacity building as core elements of its CBRN cooperation strategy. Psikolitikta et al. (2020) examine intelligence collaboration through the Our Eyes Initiative, noting its contribution to information exchange while also pointing out limitations in preparedness for deeper intelligence integration. Lee et al. (2025) further highlight ASEAN's efforts to strengthen regional responses through the coordination of Computer Emergency Response Teams, emphasising the importance of expanding capabilities and fostering public private partnerships. These initiatives demonstrate ASEAN's commitment to building collaborative mechanisms that improve situational awareness and collective response capacity.

However, challenges remain in translating these frameworks into fully integrated operational capabilities, particularly in the area of civil military interoperability. Silalahi (2023) reiterates the importance of ADMM and ADMM Plus in promoting defence cooperation, yet Harefa (2026) highlights that the absence of permanent cooperation agreements between civilian and military institutions continues to hinder effective CBRNE response. This gap underscores the need for more institutionalised mechanisms that clearly define roles, responsibilities and coordination procedures across sectors. Therefore, while ASEAN has established a solid foundation for regional cooperation, further development is required to enhance interoperability, especially in military medical coordination within CBRN contexts.

Case Study

The Malaysian Armed Forces played a significant role in the COVID-19 pandemic response through coordinated monitoring and logistics support that enhanced national crisis management. Yeap (2021) highlights the development of a COVID 19 monitoring application that enabled the MAF and the National Security Council to strengthen surveillance and control of virus transmission using geospatial technology. Halizahari et al. (2021) further demonstrate that the MAF's systematic logistics management, well equipped resources and disciplined personnel contributed to effective disaster response and coordination. These capabilities position the MAF as a critical partner in Malaysia's comprehensive pandemic response framework.

In addition, the Malaysian Armed Forces demonstrated strong civil–military collaboration through integrated healthcare support that reinforced national response capacity. Gill (2021) emphasises that the Malaysian Armed Forces Health Services enhanced the country's healthcare capability through improved inter agency coordination, particularly in areas such as pharmacy practice. Safiudin and Kutty (2023) further highlight that military involvement improved communication, coordination, resource availability and capacity building in disaster management. These findings illustrate the effectiveness of coordinated civil–military mechanisms in strengthening Malaysia's pandemic response.

Furthermore, the Malaysian Armed Forces' structured logistics systems played a crucial role in ensuring efficient coordination during the crisis. Halizahari et al. (2021) note that despite disaster management not being their primary responsibility, the MAF's organisational discipline and logistics capabilities enabled effective interagency operations. Gill (2021) also underscores the importance of integrating the Malaysian Armed Forces Health Services with other healthcare ministries to optimise limited medical resources during the pandemic. Overall, these experiences highlight the importance of early coordination and integrated command structures in enhancing military civilian collaboration during health emergencies.

LIMITATIONS

Despite providing valuable insights, this study has several limitations that should be acknowledged when interpreting the findings. The reliance on secondary data and document analysis may limit the depth of empirical

evidence, particularly in capturing real-time operational challenges and field-level perspectives. In addition, the focus on the ASEAN region may reduce the generalisability of the findings to other geopolitical contexts with different institutional structures and threat environments. Furthermore, the absence of primary data collection such as interviews or surveys may restrict the ability to fully explore stakeholder experiences and perceptions in civil–military coordination.

CONCLUSION

CBRN threats present complex and multidimensional challenges that require an integrated and coordinated response across multiple sectors. No single agency possesses the capacity to effectively manage such threats independently, highlighting the necessity for collaborative frameworks. CIMIC plays a critical role as an enabler of operational effectiveness by aligning resources, expertise and command structures during crises. Through effective CIMIC, response efforts can be streamlined, reducing duplication and enhancing overall efficiency in managing CBRN incidents.

Furthermore, the adoption of a WOGOS approach significantly strengthens both national and regional resilience against CBRN threats. By involving government agencies, military forces, private sectors and local communities, this approach fosters shared responsibility and collective preparedness. In the ASEAN context, greater emphasis must be placed on regional cooperation, interoperability and information sharing among member states. Ultimately, moving towards a unified and collaborative framework will enable ASEAN to better anticipate, respond to and recover from future CBRN challenges.

RECOMMENDATIONS

Recommendations for Organisations

Developing a comprehensive ASEAN CBRN coordination framework is essential to ensure a unified and structured approach to managing complex threats across the region. Such a framework would facilitate standardised protocols, enhance interoperability and improve collective response capabilities among member states. In parallel, strengthening CIMIC doctrine and integrating it into national and regional policies will provide clearer guidance for coordinated actions during crises. This alignment between doctrine and policy is critical for achieving consistency, efficiency and effectiveness in multi-agency operations.

In addition, investing in capacity building and joint training initiatives is vital to enhance the preparedness and competency of both military and civilian stakeholders. Regular joint exercises and simulations can improve coordination, communication and operational readiness in responding to CBRN incidents. Leveraging advanced technologies, including artificial intelligence and surveillance systems, can further strengthen early warning, situational awareness and decision-making processes. Furthermore, promoting a WOGOS approach will ensure inclusive participation, shared responsibility and stronger resilience at both national and regional levels.

Recommendations for Future Research

Future research should focus on incorporating primary data through interviews, surveys and field studies to gain deeper insights into the practical challenges of civil–military coordination in CBRN response within ASEAN. Comparative studies across different regions could also be conducted to identify best practices and adaptable models for enhancing interoperability and resilience. In addition, further exploration of emerging technologies such as artificial intelligence, big data analytics and digital surveillance systems is needed to assess their effectiveness in strengthening early warning and response capabilities. Expanding research on community engagement and behavioural responses within the WOGOS framework would also provide valuable contributions to improving overall preparedness and crisis management.

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REFERENCES

1. Alma Evelinda Silalahi. (2023). ADMM/ ADMM Plus As Cbm Through Non-Traditional Issues (ASEAN). *International Journal Of Humanities Education and Social Sciences (IJHESS)*, *2*(6). https://doi.org/10.55227/ijhess.v2i6.460
2. Babacan, A. (2023). Knowledge levels and awareness of healthcare professionals on protection from chemical, biological, radiation, nuclear hazards, and emergency aid practices. *Pamukkale Medical Journal*, 10–10. https://doi.org/10.31362/patd.1315923
3. Benolli, F., Guidotti, M., & Bisogni, F. (2021). *The CBRN Threat. Perspective of an Interagency Response* (pp. 429–448). https://doi.org/10.1007/978-3-030-42523-4_29
4. Budiman, D., Nurlaela, N., Setiawaty, V., & Chu, C. (2023). Lessons Learned from COVID-19 to better address future threats to global health security: A Critical Analysis of Experts Perspectives. *Global Biosecurity*, *5*. https://doi.org/10.31646/gbio.204
5. Campioni, L., Poltronieri, F., Stefanelli, C., Suri, N., Tortonesi, M., & Wrona, K. (2023). Enabling civil–military collaboration for disaster relief operations in smart city environments. *Future Generation Computer Systems*, *139*, 181–195. https://doi.org/10.1016/j.future.2022.09.020
6. Castriciones, E. V., & Vijayan, V. (2020). Biosecurity risk mapping and gap analysis in South East Asia. *Journal of Biosafety and Biosecurity*, *2*(1), 36–43. https://doi.org/10.1016/j.jobb.2020.03.001
7. Chaisorn, P. (2022). Civil-Military Cooperation (CIMIC) in Humanitarian Assistance and Disaster Relief (HADR): The Legal Frameworks. *Brawijaya Law Journal*, *9*(1), 16–32. https://doi.org/10.21776/ub.blj.2022.009.01.02
8. Chanthaboun Luangphane, Surachman Surjaatmadja, & Anak Agung Banyu Perwita. (2024). Defense Diplomacy and Disaster Response: Enhancing ASEAN's Collective Security Capabilities. *International Journal of Integrative Research*, *2*(7), 547–558. https://doi.org/10.59890/ijir.v2i7.2228
9. Choudary, S., Asghar, M. U., & Ibrahim, A. G. (2021). CBRN Events and Crisis Communication: Analysis of Training Needs and Development of Curriculum for Communication Personnel. *International Journal of Safety and Security Engineering*, *11*(4), 337–343. https://doi.org/10.18280/ijsse.110406
10. Cook, A. D. B., & Yogendran, S. (2020). Conceptualising humanitarian civil-military partnerships in the Asia-Pacific: (Re-)ordering cooperation. *Australian Journal of International Affairs*, *74*(1), 35–53. https://doi.org/10.1080/10357718.2019.1693498
11. Dawa, N., & Singay, J. (2025). Cross-border Mobility and Epidemic Response in South East Asia: The Way Forward. *Preventive Medicine: Research & Reviews*, *2*(5), 252–253. https://doi.org/10.4103/PMRR.PMRR_96_25
12. Djalante, R., Nurhidayah, L., Van Minh, H., Phuong, N. T. N., Mahendradhata, Y., Trias, A., Lassa, J., & Miller, M. A. (2020). COVID-19 and ASEAN responses: Comparative policy analysis. *Progress in Disaster Science*, *8*, 100129. https://doi.org/10.1016/j.pdisas.2020.100129
13. Dubb, S. S. (2020). Coronavirus pandemic: applying a whole-of-society model for the whole-of-the world. *British Journal of Oral and Maxillofacial Surgery*, *58*(7), 838–842. https://doi.org/10.1016/j.bjoms.2020.05.009
14. Erickson, T. B., Harvin, D., Schmid, A., Loevinsohn, G., Poriechna, A., Martyshyn, O., Kliukach, K., Sydlowski, M., Strong, J., & Kivlehan, S. M. (2023). Evaluation of Chemical, Biological, Radiological, Nuclear, Explosives (CBRNE) Knowledge Change and Skills Confidence Among Frontline-Line Providers During the Russia-Ukraine War. *Disaster Medicine and Public Health Preparedness*, *17*, e387. https://doi.org/10.1017/dmp.2023.52
15. Farhat, H., Alinier, G., Chaabna, K., El Aifa, K., Abougalala, W., Laughton, J., & Ben Dhiab, M. (2024). Preparedness and emergency response strategies for chemical, biological, radiological and nuclear emergencies in disaster management: A qualitative systematic review. *Journal of Contingencies and Crisis Management*, *32*(3). https://doi.org/10.1111/1468-5973.12592
16. Gad, M., Kazibwe, J., Quirk, E., Gheorghe, A., Homan, Z., & Bricknell, M. (2021). Civil–military cooperation in the early response to the COVID-19 pandemic in six European countries. *BMJ Military Health*, *167*(4), 234–243. https://doi.org/10.1136/bmjmilitary-2020-001721

17. Gill, M. S. (2021). Challenges and Changes of Pharmacy Practice During the COVID-19 Crisis in Malaysia: Instability as an Opportunity. *Malaysian Journal of Medical Sciences*, *28*(2), 171–176. https://doi.org/10.21315/mjms2021.28.2.16
18. Greaves, I., & Porter, K. (2021). Chemical, biological, radiological, and nuclear incidents. In *Oxford Handbook of Pre-hospital Care* (pp. 615–658). Oxford University Press. https://doi.org/10.1093/med/9780198734949.003.0011
19. Haghighat, H., Takian, A., Raoofi, A., & Mousavi, S. M. (2023). The Whole-of-Government, Whole-of-Society Approach in Tackling COVID-19 Pandemic in Iran: Evidence for Policymakers. *Health Scope*, *12*(4). https://doi.org/10.5812/healthscope-138471
20. Halizahari, M., Zain, R., Ismail, A., Zainol, N. A. H. M., Yaacob, S., & Che Ali, N. I. R. (2021). Accessing Malaysia Armed Forces Logistics System in Providing Humanitarian Logistics Support. *International Journal of Advanced Science Computing and Engineering*, *3*(2), 88–93. https://doi.org/10.30630/ijasce.3.2.54
21. Harefa, F. (2026). Risk-Based Modeling Approach for Strengthening Hospital Preparedness Against CBRNE Threats to Enhance Public Health. *Journal of Hunan University Natural Sciences*. https://doi.org/10.55463/issn.1674-2974.53.1.11
22. Jabbar, R., & Makki, M. (2021). Managing health disasters and Civil–Military Cooperation: A case of COVID-19 in Pakistan. *Jàmbá - Journal of Disaster Risk Studies*, *13*(1). https://doi.org/10.4102/jamba.v13i1.1113
23. Janse, J., Kalkman, J. P., Burchell, G. L., Hopperus Buma, A. P. C. C., Zuiderent-Jerak, T., Bollen, M. T. I. B., & Timen, A. (2022). Civil–military cooperation in the management of infectious disease outbreaks: a scoping review. *BMJ Global Health*, *7*(6), e009228. https://doi.org/10.1136/bmjgh-2022-009228
24. Kapucu, N., & Hu, Q. (2022). An Old Puzzle and Unprecedented Challenges: Coordination in Response to the COVID-19 Pandemic in the US. *Public Performance & Management Review*, *45*(4), 773–798. https://doi.org/10.1080/15309576.2022.2040039
25. Kegyes, T., Süle, Z., & Abonyi, J. (2024). Machine learning -based decision support framework for CBRN protection. *Heliyon*, *10*(4), e25946. https://doi.org/10.1016/j.heliyon.2024.e25946
26. Khorram-Manesh, A., Mortelmans, L. J., Robinson, Y., Burkle, F. M., & Goniewicz, K. (2022). Civilian-Military Collaboration before and during COVID-19 Pandemic—A Systematic Review and a Pilot Survey among Practitioners. *Sustainability*, *14*(2), 624. https://doi.org/10.3390/su14020624
27. Lee, B. T. F., Kornphetcharat, K., Sims, J. P., Linh Dieu, D., & Salman Ali, B. (2025). ASEAN Cybersecurity Cooperation Strategy: Combating Cyber Terrorism and Hackers Through CERT Coordination. *International Journal of Law and Public Policy (IJLAPP)*, *7*(1), 20–30. https://doi.org/10.36079/lamintang.ijlapp-0701.788
28. Long, F., & Majumdar, A. (2025). Casualty Behaviour and Mass Decontamination: A Narrative Literature Review. *Urban Science*, *9*(7), 283. https://doi.org/10.3390/urbansci9070283
29. Määttä, S. (2021). Rethinking collaborative action and citizen empowerment: Characterising a Whole-of-Society approach to the energy transition. *Energy Research & Social Science*, *81*, 102277. https://doi.org/10.1016/j.erss.2021.102277
30. Pačka, R., & Mareš, M. (2023). Achieving Cyber Power Through Integrated Government Capability: Factors Jeopardizing Civil-Military Cooperation on Cyber Defense. *Journal of Applied Security Research*, *18*(3), 436–461. https://doi.org/10.1080/19361610.2021.2006033
31. Psikolitikta, H., Swastanto, Y., Mahroza, J., & . K. (2020). ASEAN Intelligence Cooperation QUA Regional Constellation Preventive: An Enigma. *The International Journal of Humanities & Social Studies*, *8*(5). https://doi.org/10.24940/theijhss/2020/v8/i5/HS2005-051
32. Ries, M. (2022). Global key concepts of civil-military cooperation for disaster management in the COVID-19 pandemic—A qualitative phenomenological scoping review. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.975667
33. Ruggiero, A., Piotrowicz, W. D., & John, L. (2024). Enhancing societal resilience through the whole-of-society approach to crisis preparedness: Complex adaptive systems perspective – The case of Finland. *International Journal of Disaster Risk Reduction*, *114*, 104944. https://doi.org/10.1016/j.ijdrr.2024.104944

34. Safiudin, S. I. binti, & Musa Kutty, N. F. binti. (2023). The Rationale for Collaborative Approach with Military Involvement to Strengthen Urban Disaster Management Strategy: A Case Study of Malaysia. *International Journal of Academic Research in Business and Social Sciences*, *13*(3). https://doi.org/10.6007/IJARBSS/v13-i3/16549
35. Santos, V. M. S., & Siman, M. (2024). Civil-military relations as a 'coordination problem'? doctrine development and the multiple 'missions' of the Brazilian Armed Forces. *Critical Military Studies*, *10*(2), 171–191. https://doi.org/10.1080/23337486.2022.2047502
36. Szklarski, Ł. (2024). The Threat of CBRN Terrorism: An Overview and Improvised Use of Chemical, Biological, Radiological and Nuclear Materials. *Zeszyty Naukowe SGSP*, *2*(91), 39–62. https://doi.org/10.5604/01.3001.0054.7565
37. Tene, L., Godjedo, P., Amadou, B., Mbasha, J.-J., Oyugi, B., & Baldé, T. (2022). A Systematic Literature Review of the Determinants of a Good National Civil-Military Partnership for Rapid Management and Response of Health Emergencies: Lessons for Africa. *Prehospital and Disaster Medicine*, *37*(S2), s79–s79. https://doi.org/10.1017/S1049023X22001789
38. Toneva, H. S. (2024). Short presentation of study on Civil-Military Cooperation – its meaning, leading principles and functions and the cooperation in emergency situations. *Przegląd Nauk o Obronności*, (17), 73–79. https://doi.org/10.37055/pno/186046
39. Trajano, J. C., & Caballero-Anthony, M. (2020). The Future of Nuclear Security in the Asia-Pacific: Expanding the Role of Southeast Asia. *International Journal of Nuclear Security*. https://doi.org/10.7290/ijns060208
40. Wankmüller, C., & Reiner, G. (2021). Identifying Challenges and Improvement Approaches for More Efficient Procurement Coordination in Relief Supply Chains. *Sustainability*, *13*(4), 2204. https://doi.org/10.3390/su13042204
41. Wigell, Mikael., Mikkola, Harri., & Juntunen, Tapio. (2021). *Best practices in the whole-of-society approach in countering hybrid threats : study*. European Parliament. https://doi.org/10.2861/702047
42. Wignjadiputro, I., Widaningrum, C., Setiawaty, V., Widuri Wulandari, E., Sihombing, S., Prasetyo, W. A., Azhar, M., iL Rim, K., Pang Junxiong, V., Waworuntu, W., & Subuh, M. (2020). Whole–of–society approach for influenza pandemic epicenter Containment exercise in Indonesia. *Journal of Infection and Public Health*, *13*(7), 994–997. https://doi.org/10.1016/j.jiph.2019.12.009
43. Yeap, W. C. (2021). COVID-19 Monitoring Application for Malaysian Armed Forces and National Security Council. *IOP Conference Series: Earth and Environmental Science*, *767*(1), 012013. https://doi.org/10.1088/1755-1315/767/1/012013