Climate Adaptation Through Defense Diplomacy in the Indo-Pacific Region

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ABSTRACT

This study investigates the contribution of defense diplomacy to climate change adaptation efforts in the Indo-Pacific region, focusing specifically on two prominent regional mechanisms: the ASEAN Defence Ministers' Meeting (ADMM)—including ADMM Plus— and the Quadrilateral Security Dialogue (Quad). Employing Cottey and Forster's conceptual framework of defense diplomacy—which emphasizes cooperative military engagement for building confidence and addressing shared security concerns—this paper analyzes how both platforms have formally integrated climate change into their agendas. While the climate-security nexus has often been underemphasized in traditional defense cooperation, this research finds that activities such as Humanitarian Assistance and Disaster Relief (HADR), military medicine, and information sharing serve as key operational components that indirectly strengthen regional climate resilience. Both ADMM and the Quad have acknowledged the significance of climate adaptation; yet, the Quad demonstrates a more coordinated approach with clearer strategies and programs. By highlighting these dynamics, this study underlines the growing importance of defense diplomacy as a mechanism for addressing non-traditional security threats in the Indo-Pacific.

Keywords: *Climate Change Adaptation, Defense Diplomacy, Indo-Pacific*

Penelitian ini mengkaji kontribusi diplomasi pertahanan terhadap upaya adaptasi perubahan iklim di kawasan Indo-Pasifik, dengan fokus khusus pada dua kerja sama pertahanan yaitu ASEAN Defence Ministers' Meeting (ADMM)—termasuk ADMM Plus—dan Quadrilateral Security Dialogue (Quad). Dengan menggunakan kerangka konseptual diplomasi pertahanan dari Cottey dan Forster—yang menekankan kerja sama militer untuk membangun kepercayaan antar negara dan menangani isu-isu keamanan bersama—kajian ini menganalisis bagaimana kedua platform tersebut secara formal telah mengintegrasikan isu perubahan iklim ke dalam agenda kerja samanya. Meskipun hubungan antara isu iklim dan keamanan sering kali kurang mendapatkan perhatian dalam kerja sama pertahanan tradisional, penelitian ini mengemukakan argumen bahwa aktivitas seperti bantuan kemanusiaan dan penanggulangan bencana, military medicine, dan pertukaran informasi secara tidak langsung memperkuat ketahanan iklim di kawasan. Baik ADMM maupun Quad telah mengakui pentingnya adaptasi perubahan iklim; namun, Quad menunjukkan pendekatan yang lebih terkoordinasi dengan strategi serta program yang lebih jelas. Dengan menyoroti dinamika ini, studi ini menegaskan pentingnya diplomasi pertahanan sebagai mekanisme untuk menangani ancaman keamanan non-tradisional di Indo-Pasifik.

Kata-kata kunci: *Adaptasi Perubahan Iklim, Diplomasi Pertahanan, Indo-Pasifik*

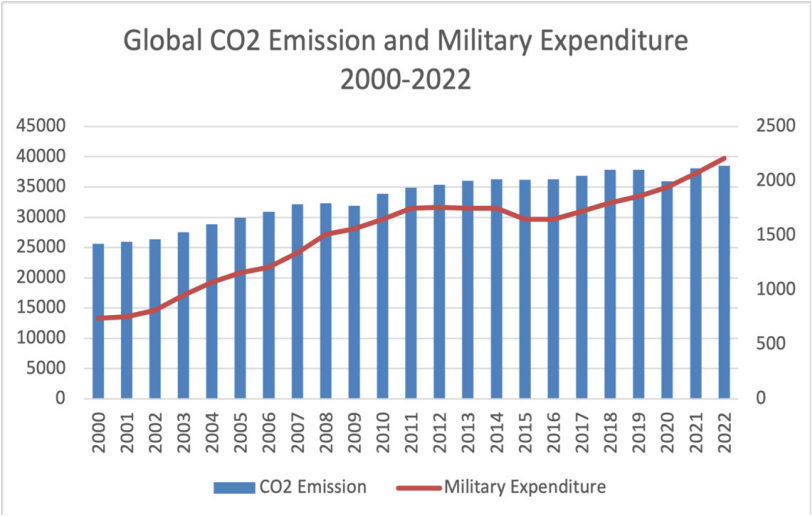
In the recent era, the Indo-Pacific region faces a dual strategic reality: rising geopolitical competition on the one hand and climate-related issues on the other. While much of the academic and policy discourse highlights the rivalry between China and the United States (U.S.) and the potential for an arms race following the establishment of the alliance between Australia, the United Kingdom (U.K.), and the U.S. (AUKUS), non-traditional threats—particularly those stemming from climate change—also loom over the region. Home to many coastal states, the Indo-Pacific is already highly vulnerable to natural disasters and will be increasingly impacted by climate change, including sea level rise, typhoons, extreme heat waves, and droughts, all of which carry implications for other sectors such as public health and economic activity. Caballero-Anthony and Cook (2024) identify at least ten countries in the region that are highly vulnerable to climate-related disasters, including Bangladesh, Cambodia, China, India, Indonesia, Laos, Pakistan, the Philippines, Myanmar, and Thailand—not to mention the Pacific Island states, which face the existential threat of losing their territories due to rising sea levels.

As climate change has the potential to compound existing crises, the phenomenon is no longer merely considered an environmental issue but also a threat to global security. In fact, according to the research conducted by Sharifi et al. (2021), the nexus of climate change and security discourse has been frequently studied for the past three decades. Indeed, climate change events can be considered a threat to human security (United Nations n.d.-a), making the issue an integrated part of security studies under the term "climate security". The United Nations Development Programme (UNDP) defines climate security as 'the impacts of the climate crisis on peace and security, particularly in fragile and conflict-affected settings' (UNDP 2023). Nevertheless, the notion that climate change can negatively impact peace and stability is nothing new. Degroot (2018), for example, mentioned that even during the Bronze Age, climate change had played a role in inducing conflict and war among civilians.

Given their ability to pose a threat to the survival of the state and the human race, national security actors are expected to be pioneers in the fight against climate change. To date, military institutions

continue to receive significant criticism for contributing to carbon emissions, thus playing a role in worsening climate change.

Figure 1.
Relationship between Global CO2 Emission and Military Expenditure 2000-2022



Source: World Bank (n.d.)

Figure 1. shows that from 2000 to 2022, the international community is on an upward trend in two areas: carbon dioxide emissions and military spending. Although carbon emissions result from a wide range of human activities—not limited to military activities—as estimated by Scientists for Global Responsibility (SGR), the global military carbon footprint accounts for 5.5% of total global emissions (Parkinson 2023). A few of the armed forces from developed countries, such as the U.S. and the U.K., have responded to these criticisms by developing more energy-efficient and environmentally friendly weapons, such as the U.S. F/A-18 fighter jet, which runs on biofuel energy (Brzoska 2012).

The U.S. and U.K.'s push for greener military technologies reflects a broader shift in military roles toward addressing non-traditional security threats like climate change. Although the Indo-Pacific is marked by U.S.-China rivalry, this article argues that regional militaries also cooperate on climate-related challenges. While few

Indo-Pacific states have formally incorporated climate change into defense strategies, joint HADR exercises demonstrate practical military engagement in climate adaptation. The study explores how regional defense partnerships integrate climate concerns into collaborative efforts. This article examines how regional defense platforms—ADMM, ADMM Plus, and the Quad—address climate-related security challenges through joint exercises, dialogues, and HADR missions. While multilateral defense cooperation also includes the long-standing Five Power Defence Arrangements (FPDA), comprising the U.K., Australia, New Zealand, Malaysia, and Singapore, the FPDA has yet to formally integrate climate adaptation into its agenda. Although it has included HADR since 2008, formal climate discussions will only commence in November 2025 with a new Climate Change and Sustainability Project Team (FPDA 2024).

A similar case applies to AUKUS, a newly established defense partnership in the Indo-Pacific region. The emergence of this cooperation has been met with criticism and concern from both states and civil society. Indonesia and Malaysia, for instance, have expressed that the formation of AUKUS may exacerbate the risk of an arms race in the Indo-Pacific rather than contribute to regional stability (Patton 2024). AUKUS also does not prioritize cooperation on non-traditional security issues in general, nor on climate change in particular. This matter has led to public criticism of the initiative as being counterproductive to Australia's own Nationally Determined Contribution (NDC), which commits to reducing greenhouse gas emissions by 43% below 2005 levels by 2030 (Australian Government Department of Industry, Science, Energy and Resources 2022). Accordingly, ADMM and Quad are important to study in this context, as both cooperative frameworks have explicitly integrated climate change into their agendas through the Joint Statement on Resilience to Climate-related and Other Natural Disaster and Q-CHAMP, respectively. Specifically, for ADMM the framework involves major powers in the Indo-Pacific such as China and the U.S., offering a distinct perspective on the potential for cooperation between these two rivals in addressing shared security threats.

Moreover, it is important to note that in addressing the impacts of climate change, adaptation efforts are no less important than mitigation, as stated in Article 7, Paragraph 1 of the Paris Agreement. In this context, mitigation refers to efforts to reduce the sources of climate change, such as lowering carbon emissions, whereas adaptation encompasses measures aimed at minimizing the adverse effects of climate change while strengthening the resilience of natural systems and human societies to withstand climate-related disruptions (Klein et al. 2007). Thus, adaptation efforts are believed to reduce losses and improve public safety. The United Nations Framework Convention on Climate Change (UNFCCC) emphasizes the importance of involving various stakeholders and elements of society in designing successful and inclusive adaptation strategies. The urgency to enhance adaptive capacity to climate change is also reflected in the adaptation spending by developing countries, which amounted to only U.S. $32.4 billion, while the total estimated adaptation cost by the United Nations reaches U.S. $387 billion per year (United Nations n.d.-b). In other words, developing countries are highly vulnerable to the impacts of climate change and often lack adequate adaptive capacity.

In view of these dynamics, this study endeavors to contribute to a broader understanding of defense cooperation in the Indo-Pacific by highlighting its potential role in supporting climate change adaptation—an area that remains underexplored in existing literature. In recent years, regional defense partnerships have increasingly been interpreted through the lens of strategic competition, particularly in the context of China's growing geopolitical influence and the subsequent formation of AUKUS. According to Burgess and Beilstein (2018), security cooperation in the Indo-Pacific has the potential to evolve into an "Asian NATO", particularly if regional threats posed by China and North Korea continue to escalate. Such developments have led to perceptions that defense cooperation is primarily aimed at alliance-building, which may risk escalating regional tensions. By focusing on initiatives such as ADMM and the Quad, this research offers an alternative perspective that recognizes how defense cooperation can also function as a platform for addressing non-traditional security challenges.

Toward a Climate-Responsive Defense Diplomacy

Cottey and Forster (2004) introduced a new perspective on inter-state military cooperation, commonly referred to as defense diplomacy. As the world witnesses an increasing complexity in security threats, defense diplomacy today functions primarily to foster cooperation among security-related institutions across nations, aiming to enhance national security and maintain regional stability. This evolving nature of defense diplomacy is what Cottey and Forster term as "new defense diplomacy". Under this concept, military cooperation is expected to contribute to the preservation of democratic values globally, ensure the protection of human rights, and foster a collaborative environment among nations in addressing other pressing global threats.

Consequently, in the context of new defense diplomacy, the term "threat" no longer refers solely to rival states, but rather to issues and phenomena that pose risks not just to individual countries, but also to broader societies which often transcend territorial boundaries. As such, addressing these types of challenges requires cooperation, even with states that may traditionally be seen as adversaries. Given the security implications, security-related institutions—including defense ministries and armed forces—are expected to take a leading role. New defense diplomacy can be implemented through a range of cooperative activities covering (1) bilateral or multilateral engagement between senior military or civilian defense, (2) the designation of defense attachés to foreign countries, (3) bilateral or multilateral defense cooperation agreements, (4) providing training to foreign military defense-related personnel, (4) offering expertise and guidance on ensuring democratic oversight of armed forces, managing defense systems, and addressing technical military matters, (5) regular dialogue and exchanges of military personnel and unites between countries, as well as visit by military ship, (6) placing military and defense-related personnel in partnering ministries of defense or armed forces, (7) deploying training missions, (8) assisting other countries in military equipment and other defense-related aid, and (9) bilateral or multilateral joint exercise (Cottey and Forster 2004).

Since climate change began to be linked with security studies and recognized as a source of threat, the literature has evolved to examine both the impact of military activities on climate change and vice versa, as well as how military institutions seek to contribute to climate change mitigation through the adoption of sustainable military technologies (Smith 2011; Nagel 2011). As a result, studies focusing on international security cooperation in building climate resilience and adaptation remain understudied. Nevertheless, this does not negate the fact that cooperation among security institutions is essential as part of broader efforts to adapt to climate change.

Indeed, climate change does not only result in environmental degradation but also indirectly leads to economic disruption as well as social and political conflicts. Rising sea levels not only alter coastlines but also exacerbate natural disasters, such as floods and increasingly frequent storms, which can damage infrastructure and economic systems—particularly affecting coastal communities that rely on the ocean for their livelihoods in sectors such as fisheries and tourism (Asuncion and Lee 2017). Further, Remmits and Rademaker (2021) argue that mass migration is also one of the indirect impacts of climate change, which can lead to social and political instability. This, in turn, necessitates the involvement of security institutions—both to strengthen state capacity in anticipating such impacts and to manage the consequences once they occur.

Accordingly, security institutions, including the military and armed forces, can contribute to both mitigation and adaptation strategies. In terms of mitigation, for instance, the U.S. Army Corps of Engineers has developed the Coastal Storm Modeling System (CSTORM-MS), which provides risk assessments related to storm disasters, particularly in coastal areas (US Army Corps of Engineer 2012). Military equipment can also support states in implementing climate change adaptation strategies, particularly through HADR missions, including rescue operations and aid delivery, in an effective and efficient manner following climate-induced natural disasters (Idris and Che Soh 2014; Remmits and Rademaker 2021). Brzoska (2015) noted that, in contributing to climate change response, armed forces can serve as “armed

rescuers" and "humanitarians" by enhancing their capacity in disaster management and humanitarian interventions. Moreover, Jayaram and Brisbois (2021) also argued that military institutions are expected to adjust their strategies and operations in response to the growing need for climate change adaptation. Therefore, this study aims to reframe the understanding that defense cooperation also plays a crucial role in supporting climate change adaptation efforts.

Climate Change Adaptation in Indo-Pacific Defense Platform

While climate change remains a primarily environmental concern in policy narratives, defense institutions in the Indo-Pacific region have increasingly engaged in cooperative frameworks that touch on climate-related challenges. This section analyzes to which extent the two regional defense platforms, namely the ADMM and the Quad, incorporate climate change adaptation into their strategic agenda. By examining the scope and depth of climate-oriented activities within each initiative, this analysis aims to reveal the evolving nature of defense diplomacy in addressing non-traditional security threats in the region.

The ADMM was launched in 2006 as the main platform for ASEAN countries to engage in defense and security cooperation. ADMM has been described as the highest consultative forum for ASEAN members to address various regional security challenges. In 2010, the ADMM expanded its membership by including ASEAN dialogue partners such as Australia, China, the United States, India, Japan, South Korea, Russia, and New Zealand under the ADMM Plus framework. To date, cooperation activities under ADMM or ADMM Plus have primarily focused on non-traditional security issues such as maritime security, counter-terrorism, HADR, cyber security, military medicine, and peacekeeping operations. The ADMM exemplifies how defense forces are being utilized by countries to collaborate rather than compete, in order to enhance mutual security. The participation of both China and the U.S. in this same defense cooperation framework is also seen as a means to foster mutual trust and reduce rivalry between the two powers.

With regard to climate change adaptation, the majority of ASEAN member states individually recognize that the impacts of climate change pose threats to both state and society, and emphasize defense cooperation mechanisms to enhance adaptive capacity, particularly in disaster response (Cook and Nanthini 2023). In a similar manner, non-ASEAN states that are part of ADMM Plus also stress multilateral mechanisms in responding to climate change, not to mention the urgency of military reform as a mitigation strategy. Military reform in this context also includes the use of low-carbon and energy-saving military equipment, as implemented by Singapore, Brunei, the U.S., and the U.K.

Furthermore, multilaterally within the ADMM and ADMM Plus framework, this cooperation has in fact regularly conducted various joint activities to address non-traditional threats since its establishment. As the main framework for coordinating defense cooperation among ASEAN and its eight dialogue partners, ADMM and ADMM Plus have formed several Experts' Working Groups (EWGs) to facilitate defense cooperation in areas such as maritime security, HADR, military medicine, as well as peacekeeping operations. These sectors are crucial in enhancing the preparedness of countries and communities to face the impacts of climate change.

Kaplan et al. (2025) mention that climate change also impacts supply chains, as climate-related disasters can disrupt the production and delivery of medicines and medical equipment, as well as affect the quality of healthcare services. Regarding military medicine, the ADMM held the first meeting of the EWG in 2011 and established the ASEAN Center for Military Medicine in 2019. Military Medicine refers to military cooperation between countries to provide medical services to communities in need, both during wartime and in non-war situations such as post-disaster scenarios (Pitakdumrongkit 2016). The role of military medicine cooperation in strengthening adaptation to climate change impacts has become increasingly recognized at the 11th ASEAN Chiefs of Military Medicine Conference held in Brunei in 2024 (Ministry of Defense Brunei Darussalam 2024).

Cooperation in the field of HADR has also been consistently carried out by the ADMM and ADMM Plus since 2009 and 2011,

respectively. In 2016, ADMM Plus reportedly conducted a joint exercise between the military medicine and HADR working groups in Thailand to enhance the capacity of member states in conducting rescue, evacuation, and medicine distribution during natural disasters, including typhoons (MINDEF Singapore 2016). In the same year, the ADMM officially launched the ASEAN Military Ready Group on HADR to strengthen and accelerate military coordination among countries in emergency disaster situations, in line with ASEAN's commitment to disaster management known as 'One ASEAN, One Response' (Canyon et al. 2020).

To underscore its continued commitment to enhancing regional resilience, the ADMM Plus in 2024 adopted a Joint Statement on Resilience to Climate-related and Other Natural Disasters (ASEAN Secretariat 2024). This document highlights the urgency of strengthening regional mechanisms to address the multidimensional impacts of climate change, particularly in terms of humanitarian assistance, disaster risk reduction, and post-disaster recovery. A key emphasis of the joint statement lies in fostering the exchange of best practices, promoting interoperability, and enhancing capacity-building efforts among member states. Through this initiative, ADMM Plus countries reaffirmed their collective intention to deepen cooperation and improve preparedness in facing climate-induced security threats, which are increasingly recognized as destabilizing forces that transcend national boundaries. The statement marks a significant milestone in aligning defense cooperation with broader climate adaptation and disaster response agendas in the Asia-Pacific region. The joint statement not only underscores the evolving role of defense cooperation in addressing non-traditional security threats, but also highlights the growing recognition that climate resilience is integral to regional stability and requires sustained, collective military engagement rather than competition.

> ''Enhance collaboration and cooperation among the ADMM-Plus Countries to further enhance capacity-building in the activities including HADR, Search and Rescue and Early Warning System and climate change adaptation through existing related mechanisms and by exploring innovative approaches in order for the ADMM-Plus Countries' militaries to

> be better equipped and ready to respond to climate-related emergencies in a coordinated and effective manner." (ADMM Plus 2024)

While the ADMM and ADMM-Plus exemplify a more formal, regionally-centered defense cooperation framework led by ASEAN to bolster adaptive capacities in the face of climate change, the Quad offers a more flexible and strategically aligned partnership. The Quad, comprising the U.S., Japan, India, and Australia, has increasingly incorporated climate resilience into its strategic agenda, albeit through mechanisms that reflect its broader geopolitical objectives. Unlike the institutionalized nature of ADMM cooperation, the Quad leverages informal diplomatic coordination to promote initiatives such as sustainable infrastructure, clean energy transitions, and climate-resilient technologies. Both arrangements, though structurally different, reflect an evolving recognition of climate change as a transboundary security issue, requiring multi-layered responses across formal and informal regional architectures. Quad—initially formed to respond to natural disasters took place in Indian Ocean—was later said to have evolved into traditional security cooperation specifically to contain China. Japan, in particular, with its Free and Open Indo-Pacific (FOIP) concept, views India as a strategic partner, and cooperation with India is crucial in its mission to balance China's growing influence in the Indo-Pacific region. The transformation of the Quad into a traditional security cooperation is indeed contentious. Leaders of each member state assert that the Quad is not a military alliance, as Anthony Blinken mentioned.

> ''That QUAD is not a military alliance. It is a group of like-minded democracies. India, the United States, Japan, Australia, coming together to work cooperatively on issues and matters that are going to affect the lives of citizens and all of our countries and indeed, in the Indo Pacific as a whole and beneath that is the conviction that the Indo Pacific needs to remain a free and open region." (CNBC 2021)

It is inevitable, however, that cooperation on non-traditional security issues has been a boost to the four countries' cooperation on traditional issues. For example, in August 2007, the three navies of the U.S., India, and Japan conducted joint exercises in

the Western Pacific, and a month later Japan and Australia were invited to participate in the annual Malabar exercise, which has been organized by the U.S. and India since 1994 (O'Neil and West 2020).

Quad member states view climate change as a dangerous source of instability, if not equal to the Chinese threat. In 2022, the Quad launched its new mechanism called the Quad Climate Change Adaptation and Mitigation Package (Q-CHAMP), which is based on three pillars, including climate ambition, clean energy, and adaptation/resilience (MOFA Japan 2022). With regard to climate change adaptation, the Quad member states emphasize cooperation in areas such as information-sharing, disaster risk reduction, climate-smart agriculture, and ecosystem-based adaptation, particularly concerning the preservation and resilience of marine ecosystems (MOFA Japan 2022). As a follow-up to its information-sharing cooperation, in 2023, the member states of the Quad reaffirmed their commitment to supporting climate resilience in the Pacific region by providing technical assistance to Pacific Island countries. This support is channeled through the Weather Ready Pacific Initiative, a regional mechanism initiated by Pacific nations aimed at strengthening infrastructure for weather forecasting and early warning systems (The White House 2023; SPREP 2024). The 2022 Quad Leaders' Summit also underscored the group's commitment to advancing technology and conducting capacity-building programs for countries in the Indo-Pacific region, particularly in the area of maritime domain awareness. These efforts are also instrumental in monitoring the impacts of climate change, including sea level rise and marine ecosystem degradation (Australia Department of Prime Minister and Cabinet, n.d.; The White House 2024).

Table 1.
Quad Climate Program under Q-CHAMP

The Pillar	Cooperation Program
Climate Mitigation	Green shipping and ports under the Quad Shipping Taskforce
	Clean hydrogen and ammonia
	Methane reduction in the natural gas sector
	Carbon recycling
	Clean energy supply chain
	Supporting capacity building for implementation of Article 6 of Paris Agreement
	Knowledge sharing on subnational climate actions
	Knowledge sharing on reducing hydrofluorocarbons emissions
Adaptation/ resilience	Critical climate information-sharing including the climate and information service task force
	Disaster risk reduction including disaster and climate-resilient infrastructure
	Climate-smart agriculture
	Ecosystem-based adaptation and resilience focusing on marine ecosystems advanced by nature-based solutions

Source: MOFA Japan (2022)

Similar to the ADMM, HADR has also become an integral component of the Quad's climate change adaptation agenda. In 2022, the Quad introduced a set of HADR cooperation guidelines, outlining that member states would conduct tabletop HADR exercises twice annually. These exercises focus on simulation and strategic planning for disaster response through discussion-based methods, rather than field-based drills (Ministry of External Affairs India 2022). These activities have already been conducted—first in India in 2022 and subsequently in Australia in 2023—resulting in the development of disaster response procedures (Haby 2023). In addition to fostering coordination among member states, the Quad has actively collaborated with a range of stakeholders, including governmental and non-governmental organizations, to

strengthen civil-military coordination in responding to climate-induced disasters (Prime Minister of Australia 2024). A recent tabletop exercise was carried out by the Quad in Honolulu, Hawaii, from April 28 to May 2, focusing on simulating the rapid and efficient delivery of humanitarian logistics. Notably, during this exercise, member states agreed to establish the Quad Indo-Pacific Logistics Network, a platform for sharing logistical capacities (U.S. Department of State 2025; Hindustan Times 2025). It is also important to highlight the relevance of HADR-related cooperation between individual member states outside the formal Quad framework, as such engagements reinforce intra-Quad collaboration. For example, India's recurring Malabar and Milan Naval Exercises—which regularly involve other Quad members—covering the search and rescue training as well as HADR operations in the aftermath of natural disasters (Sarowa 2023).

Conclusions

Although the Indo-Pacific region has not yet experienced a full-scale conflict directly resulting from climate-induced disasters—such as mega-typhoons triggering mass displacement or resource-driven tensions—emerging climate risks have heightened the urgency for proactive measures. Given the increasing frequency and intensity of climate-related hazards, the potential for these events to act as threat multipliers is widely acknowledged. In this context, it is imperative for states to enhance their preparedness and resilience. One strategic approach is to integrate military institutions more systematically into climate adaptation and disaster response frameworks. Military cooperation—particularly through joint training, information sharing, and HADR missions—can play a critical role in strengthening regional capacities to respond to complex emergencies linked to climate change.

This research finds that defense cooperation aimed at enhancing capacities for conducting HADR missions constitutes the most prominent form of climate adaptation efforts undertaken by both the ADMM and the Quad. While HADR joint training is not a novel practice for the ADMM, recent developments indicate a growing recognition of the critical role of inter-state military collaboration

in the areas of HADR and military medicine to bolster national and societal preparedness in the face of climate-induced disasters. The commitment of both the ADMM and the Quad to address climate change is reflected in their policy decisions to explicitly integrate climate adaptation into their strategic agendas. From the perspective of defense diplomacy, these activities align with the framework proposed by Cottey and Forster, particularly regarding joint training exercises, regular dialogues, and senior official engagements, which are increasingly directed toward addressing non-traditional security challenges—such as climate adaptation—rather than conventional military threats or inter-state conflict.

Nonetheless, the extent to which regional defense partnerships embed the climate change agenda into their collaborative activities varies by institutional structure. The Quad has taken a relatively advanced approach by establishing a Quad Climate Program, which coordinates efforts on climate resilience, green infrastructure, and disaster preparedness, positioning climate change as a strategic security challenge. Meanwhile, the ADMM-Plus forum has gradually incorporated climate concerns through its Non-Traditional Security and HADR frameworks. Although ADMM-Plus does not always explicitly frame its initiatives under the climate change agenda, many of its joint activities—particularly in HADR and military medicine—tangibly address the consequences of climate-related risks. The release of joint statements on climate resilience signals a clear institutional commitment to integrating climate considerations within its cooperative framework. However, compared to Quad, the translation of these commitments into structured and targeted programs remains more limited as evidenced by the absence of further elaboration on specific technical aspects. The initiatives undertaken by both mechanisms indicate that climate-related concerns are not confined to rhetorical acknowledgment but are progressively being operationalized—albeit to differing extents and levels of institutional maturity. As the frequency and intensity of climate-induced disasters continue to escalate, it is imperative that regional defense cooperation evolves into a proactive instrument for fostering resilience and long-term stability.

Lastly, in the Indo-Pacific—an arena where strategic rivalries converge with acute environmental vulnerabilities—integrating security imperatives with sustainability objectives is no longer a matter of choice but one of urgent necessity. This urgency is further underscored by the sluggish pace of global climate mitigation efforts and carbon emission reductions, which continue to lag behind the scale of the crisis. Therefore, the role of the national militaries and armed forces cooperation among countries in the region remains relevant as a focus of future security studies to capture the evolving dynamics of military cooperation in addressing climate change issues. Furthermore, future research should also examine the extent to which global climate frameworks incorporate military and defense aspects in adaptation and mitigation efforts.

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References

Book and Book Chapter

Cottey, Andrew, and Anthony Forster (eds.), 2004. *Reshaping Defence Diplomacy: New Roles for Military Cooperation and Assistance*. London: Oxford University Press.

Degroot, Dagomar, 2018. "Climate Change and Conflict", in White, Sam, et al. (eds.), 2018. *The Palgrave Handbook of Climate History*. London: Palgrave Macmillan.

O'Neil, Andrew, and Lucy West, 2020. "THE QUADRILATERAL SECURITY DIALOGUE AND INDO-PACIFIC MINILATERALISM. Resurrection without Renewal? Andrew O'Neil and Lucy West", in Singh, Bhubhindar, and Sarah Teo (eds.), 2020. *Minilateralism in the Indo-Pacific. The Quadrilateral Security Dialogue, Lancang-Mekong Cooperation Mechanism, and ASEAN*. Oxon: Routledge.

Sarowa, Chanchal, 2023. "Quad HADR Strategy for the Indo-Pacific", in Singh, Swaran, and Reena Marwah (eds.), 2023. *Multilateralism in the Indo-Pacific: Conceptual and Operational Challenges*. Oxon: Routledge.

Journal and Online Journal

Brzoska, Michael, 2012. "Climate Change and the Military in China, Russia, the United Kingdom, and the United States", *Bulletin of the Atomic Scientists*, **68**(2): 43–54.

———, 2015. "Climate Change and Military Planning", *International Journal of Climate Change Strategies and Management*, **7**(2): 172–190.

Burgess, Stephen F., and Janet Beilstein, 2018. "Multilateral Defense Cooperation in the Indo-Asia-Pacific Region: Tentative Steps toward a Regional NATO?", *Contemporary Security Policy*, **39**(2): 258–279.

Caballero-Anthony, Mely, and Alistair David B. Cook, 2024. "Understanding Climate Security in the Indo-Pacific", *Third World Quarterly*, **45**(14): 2039–2046.

Canyon, Deon, et al., 2020. "Structuring ASEAN Military Involvement in Disaster Management and the ASEAN Militaries Ready Group", *Security Nexus*: 1–7.

Idris, Aida, and Saiful Nizam Che Soh, 2014. "The Relative Effects of Logistics, Coordination and Human Resource on Humanitarian Aid and Disaster Relief Mission Performance", *The South East Asian Journal of Management*, **8**(2): 87–103.

Jayaram, Dhanasree, and Marie Claire Brisbois, 2021. "Aiding or Undermining? The Military as an Emergent Actor in Global Climate Governance", *Earth System Governance*, **9**: 1-5.

Kaplan, Warren A., et al., 2025. "The Potential Impact of Climate Change on Medication Access and Quality Deserves Far More Attention", *One Health*, **20**:1-3.

Nagel, Joane, 2011. "Climate Change, Public Opinion, and the Military Security Complex", *The Sociological Quarterly*, **52**:203–210.

Remmits, Femke, and Michel Rademaker, 2021. "Acting Collectively: Why Climate Calls for Innovative Contributions and Collaboration", *Source: Atlantisch Perspectief*, **45**(5): 37–42.

Sharifi, Ayyoob, et al., 2021. "Three Decades of Research on Climate Change and Peace: A Bibliometrics Analysis", *Sustainability Science*, **16**(4): 1079-1095.

Smith, Paul. J., 2011. "The geopolitics of climate change: Power transitions, conflict and the future of military activities", *Conflict, Security and Development*, **11**(3):309–334.

Reports

Australian Government Department of Industry, Science, Energy and Resources, 2022. Australia's Nationally Determined

Contribution Communication 2022.

Cook, Alistair David B., and S. Nanthini, 2023. Mitigate, Adapt, Prepare: A Climate Security Agenda for the ASEAN Defence Ministers' Meeting.

Klein, Richard J.T., et al., 2007. "Inter-Relationships between Adaptation and Mitigation", in Parry, Martin L., et al. (eds.), 2007. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.*

Pitakdumrongkit, Kaewkamol, 2016. Military Medicine Cooperation Under The ADMM-Plus: Progress, Challenges, and Way Forward.

Working Paper

Asuncion, Ruben C., and Minsoo Lee, 2017. "Impacts of Sea Level Rise on Economic Growth in Developing Asia", *ADB Economics Working Paper Series*, No. 507, January.

Online Articles

ADMM Plus, 2024. "Joint Statement by the ASEAN Defence Ministers' Meeting Plus on Resilience to Climate-related and Other Natural Disasters, Including through Best Practices Exchange and Capacity-building" [online]. in https://asean.org/wp-content/uploads/2024/11/Joint-Statement-by-the-ASEAN-Defence-Ministers-Meeting-Plus_Adopted-by-11th-ADMM-Plus-on-21-Nov-2024.pdf [Accessed on 21 July 2025].

ASEAN Secretariat, 2024. "The 11th ASEAN Defence Ministers' Meeting Plus (ADMM-Plus) convenes in Vientiane, Lao PDR" [online]. in https://asean.org/the-11th-asean-defence-ministers-meeting-plus-admm-plus-convenes-in-vientiane-lao-pdr/ [Accessed on 21 July 2025].

Australia Department of Prime Minister and Cabinet, n.d. "Indo-Pacific Partnership for Maritime Domain Awareness" [online]. in https://www.pmc.gov.au/resources/quad-leaders-summit-2023/indo-pacific-partnership-maritime-domain-awareness [Accessed on 9 June 2025].

CNBC, 2021. "QUAD a Group of Like-Minded Democracies, Not Military Alliance: Anthony Blinken" [online]. in https://www.cnbctv18.com/world/quad-a-group-of-like-minded-democracies-not-military-alliance-us-secy-of-state-anthony-blinken-10154541.htm [Accessed on 12 December 2024].

FPDA, 2024. "FPDA Exercise Concepts Working Group (FECWG)" [online]. in https://www.fivepowerdefencearrangements.org/newsroom/fecwg-224 [Accessed on 23 June 2025].

Haby, Neely, 2023. "Shifting Quad Relief Operations from Theory to Practice" [online]. in https://www.lowyinstitute.org/the-interpreter/shifting-quad-relief-operations-theory-practice [Accessed on 9 June 2025].

Hindustan Times, 2025. "Quad Initiative Seeks to Bolster Civilian Disaster Response in Indo-Pacific" [online]. in https://www.hindustantimes.com/india-news/quad-initiative-seeks-to-bolster-civilian-disaster-response-in-indopacific-101746702911280.html [Accessed on 9 June 2025].

MINDEF Singapore, 2016. "ADMM-Plus Military Medicine/HADR Exercise an Important Platform for Militaries to Strengthen Joint Capabilities" [online]. in https://www.mindef.gov.sg/news-and-events/latest-releases/05sep16_nr2 [Accessed on 4 June 2025].

Ministry of Defense Brunei Darussalam, 2024. "The 11th ASEAN Chiefs of Military Medicine Conference (ACMMC) Opening Ceremony" [online]. in https://www.mindef.gov.bn/Lists/News/DispForm.aspx?ID=6235 [Accessed on 4 June 2025].

Ministry of External Affairs India, 2022. "Guidelines for Quad Partnership on Humanitarian Assistance and Disaster Relief (HADR) in the Indo-Pacific" [online]. in https://www.mea.

gov.in/bilateral-documents.htm?dtl/35745/Guidelines_for_Quad_Partnership_on_Humanitarian_Assistance_and_Disaster_Relief_HADR_in_the_IndoPacific [Accessed on 9 June 2025].

MOFA Japan, 2022. "Quad Cooperation in Climate Change and Launch of the Quad Climate Change Adaptation and Mitigation Package (Q-CHAMP)" [online]. in https://www.mofa.go.jp/files/100347798.pdf [Accessed on 13 December 2024].

Parkinson, Stuart, 2023. "How Big Are Global Military Carbon Emissions?" [online]. in https://www.sgr.org.uk/resources/how-big-are-global-military-carbon-emissions [Accessed on 11 December 2024].

Patton, Susannah, 2024. "How South-East Asia Views AUKUS" [online]. in https://www.lowyinstitute.org/publications/how-south-east-asia-views-aukus [Accessed on 31 May 2024].

Prime Minister of Australia, 2024. "Joint Statement from the Leaders of Australia, India, Japan, and the United States" [online]. in https://www.pm.gov.au/media/joint-statement-leaders-australia-india-japan-and-united-states [Accessed on 12 June 2025].

SPREP, 2024. "Weather Ready Pacific, a Pacific-Led Solution for Pacific Islands Resilience Designed by Us, for Us" [online]. in https://www.sprep.org/news/weather-ready-pacific-a-pacific-led-solution-for-pacific-islands-resilience-designed-by-us-for-us [Accessed on 9 June 2025].

The White House, 2023. "Quad Leaders' Joint Statement" [online]. in https://bidenwhitehouse.archives.gov/briefing-room/statements-releases/2023/05/20/quad-leaders-joint-statement/ [Accessed on 22 July 2025].

———, 2024. "Fact Sheet: 2024 Quad Leaders' Summit" [online]. in https://bidenwhitehouse.archives.gov/briefing-room/statements-releases/2024/09/21/fact-sheet-2024-quad-leaders-summit/#:~:text=On%20September%2021%2C%202024%2C%20President,the%20fourth%20Quad%20

Leaders'%20Summit [Accessed on 9 June 2025].

UNDP, 2023. "What Is Climate Security and Why Is It Important?" [online]. in https://climatepromise.undp.org/news-and-stories/what-climate-security-and-why-it-important [Accessed on 23 December 2024].

United Nations, n.d.-a. "Five Ways the Climate Crisis Impacts Human Security" [online]. in https://www.un.org/en/climatechange/science/climate-issues/human-security [Accessed on 12 June 2025].

———, n.d.-b. "Adapting to the Impacts of Climate Change" [online]. in https://www.un.org/en/climatechange/climate-adaptation [Accessed on 3 June 2025].

US Army Corps of Engineer, 2012. "Coastal Storm Modeling System" [online]. in https://www.erdc.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/476697/coastal-storm-modeling-system/ [Accessed on 27 May 2025].

U.S. Department of State, 2025. "Quad Concludes Simulation Exercise to Advance Indo-Pacific Logistics Network" [online]. in https://www.state.gov/releases/office-of-the-spokesperson/2025/05/quad-concludes-simulation-exercise-to-advance-indo-pacific-logistics-network/ [Accessed on 9 Juni 2025].

World Bank, n.d. "Military Expenditure (Current USD)" [online]. in https://data.worldbank.org/indicator/MS.MIL.XPND.CD [Accessed on 4 February 2025].