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Climate Change and Environmental Security in Southeast Asia

1. Introduction

Geographically, Southeast Asia is particularly vulnerable to the adverse effects of climate change due to their extensive exposure to natural disasters such as flooding, droughts and increased sea level. Statistical projections suggest that the global average temperature by 2100 could increase by 3.4-3.9°C above pre-industrial levels. Furthermore, a mean temperature is projected to increase by 1-4°C in the tropical region, with the most significant impacts expected to be observed in South, East, and Southeast Asia (Corlett, 2014). In addition, the increase in sea level threatens coastal communities, where more than 150 million people reside, forcing social systems and exacerbating the risk of displacement. Seasonal and prolonged droughts

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and floods further challenge the region's water resources, emphasizing the need for immediate intervention. As weather events intensify, they not only lead to immediate environmental crises, but also incite long - term socioeconomic branches, undermining stability and intensifying existing vulnerabilities.

The interconnection between the impacts of climate change and security challenges in Southeast Asia is undeniable. However, terminology and contextual ambiguities persist among concepts such as environmental security, climate security, and related climate change terms. Clarifying the background and rationale for the selection of specific terms can significantly enhance public communication. In addition, while numerous reports have documented current environmental impacts, climate outlooks, and projected climate-related risks, this information remains highly dispersed. A more in-depth regional analysis is crucial to identify shared issues.

The author compiled a collection of prominent publications and reports on climate change and environmental security, utilizing these sources to interpret their findings within the Southeast Asian context. This review article has two primary objectives. Firstly, to investigate the diverse conceptualizations of climate change, environment, and security, and analyze the terminology employed within regional discourses. Secondly, to identify specific climate-induced risks to environmental security in Southeast Asia and examine the limitations and possible strategies in addressing climate change.

This review article has two primary objectives. Firstly, to investigate the diverse conceptualizations of climate change, environment, and security, and analyze the terminology employed within regional discourses. Secondly, to identify specific climate-induced risks to environmental security in Southeast Asia and examine the limitations in addressing climate change, and recommend strategies for mitigating these challenges.



2. The interplay of climate change and - security in the Southeast Asian context

2.1 Environmental security to climate security

The rise of environmental security in the 90s represents a critical evolution in understanding national security, intertwining ecological concerns with military and geopolitical considerations. This period has marked a significant change of paradigm in which environmental degradation and climate change began to be perceived not only as ecological issues but as threats aimed at national and international stability. The end of the cold war, combined with the growing proof of environmental degradation by human activities, has pushed political managers to reconsider the interaction between environmental health and safety.

From the 1990s to the early 2000s, environmental security concerns were gradually integrated and incorporated into the U.S. military policies and practices. A pivotal moment in this trajectory occurred with the publication of the 2007 Center for Naval Analyses (CNA) Military Advisory Board report on climate change and national security. By framing climate change as a “threat multiplier”, the report underscored how environmental degradation exacerbates existing vulnerabilities, including poverty, political instability, and resource scarcity (CAN Military Advisory Board, 2007). It also marked a paradigm shift, leading to a more focused examination of climate change within the context of national security. Subsequently, the term

“climate security”

gained prominence and was explicitly incorporated into significant pieces of U.S. legislation, such as the Global Climate Change and Security Oversight Act of 2007 and the Lieberman-Warner Climate Security Act of 2007. This period also witnessed the establishment of the Center for Climate and Security, a new think tank dedicated to this emerging field. The timeline of the evolution of these two terms is comprehensively narrated in Goodman (2023). Table 1 provides a concise overview of the historical background of the concept of environmental security and climate security.

Table 1. An overview of the historical background of a paradigm shift from environmental security to climate security

Year	Important events	Major stakeholders
1991	“Environmental security” concerns were identified	U.S. National Security Strategy
1994	Established defense-environmental relationships	The Pentagon
1996	<ul style="list-style-type: none"> - Formed the Environmental Security Initiative framework - Integrated environmental considerations in U.S. military policies and practices 	<ul style="list-style-type: none"> - U.S. Department of Defense - U.S. Department of Energy - U.S. Environmental Protection Agency
1997	Considered reducing greenhouse gas emissions	U.S. Department of Defense
1993-2001	Developed the global environmental assessments	U.S. Department of Defense
2006	<ul style="list-style-type: none"> - Formed the Center for Naval Analyses (CNA) Military Advisory Board - Addressed the national security implications of climate change - Perceived the necessity to find the term conveying the impacts of climate change to a broader audience 	<ul style="list-style-type: none"> - Sherri Goodman - U.S. Army - U.S. Navy - U.S. AirForce and Marine Corps - Renowned climate scientists
2007	<ul style="list-style-type: none"> - Published the national security implications of climate change - Climate change had been viewed as environmental issue 	CNA Military Advisory Board
2008	“Threat multiplier” was stated and became a key concept on climate change and further connections to U.S. and international security policies	U.S. Security Council
2011	Established a new think tank, the Center for Climate and Security	U.S. Government



The terms “environmental security” and “climate security” are often used interchangeably, but they have distinct nuances that can lead to ambiguity in the discourse. Vagueness in these definitions can lead to three major issues. First, overlapping concerns that many climate change impacts fall within the broader definition of environmental security. Secondly, when the terms are used interchangeably, it leads to confusion and blurring of distinctions. Lastly, the different interpretations can lead to different policy responses, with some focusing on broader environmental issues while others prioritize climate change-specific actions.

To sum up, the **“environmental security”** has a broader scope, encompasses a wider range of environmental issues beyond climate change. The key terms within this area include environmental degradation, shortage of resources, and ecological resilience (Baldwin, 2018). The focus often emphasized the potential for these environmental issues to lead to conflict or instability such as resource wars, mass migration, and social unrest. In contrast, “climate security” specifically focuses on the security implications of climate change, including extreme weather events; droughts, floods, storms, heatwaves, sea level rise. Climate security often highlights the potential for climate change to exacerbate existing security threats such as food and water insecurity, increased migration and generates geopolitical tensions and threatens international relations, which can lead to conflicts over resources (Carney, 2015).

All in all, precise terminological clarity is paramount within policy statements. Establishing shared definitions among stakeholders and selecting appropriate terminology is crucial for effective communication and the successful development of robust policies. This necessitates fostering interdisciplinary collaboration between environmental scientists, security experts, and policymakers to cultivate a shared understanding of the multifaceted issues at hand. Furthermore, it is imperative to acknowledge the context-specific nature of these challenges, as priorities and the severity of threats may vary significantly across different regions and contexts.

Therefore, the term “climate security” should be employed with greater precision when focusing specifically on the security implications of climate change impacts on the environment. By acknowledging and addressing these terminological ambiguities, we can enhance our comprehension of the intricate relationship between environmental issues and security threats, thereby facilitating the development of more effective and targeted strategies to address these complex challenges.

2.2 Situating security within the context of climate-related discourse in Southeast Asia

While the term “climate security” may not be explicitly used in many ASEAN documents and regional discussions, the concept appears to have gained some traction among ASEAN officials. This is evident in an April 2022 webinar on climate change and security organized by the ASEAN Institute for Peace and Reconciliation (ASEAN-IPR) and the United Nations. Notably, the organizers of the webinar deliberately avoided using the term “climate security” in their preparations to prevent any misinterpretations regarding the meeting's objectives, which primarily focused on raising awareness of the risks of climate change to regional and global peace and security. Consequently, the term “climate-related security” was adopted as a more acceptable alternative.

This cautious approach suggests that regional sensitivities surrounding climate security lie not in the acknowledgment of climate-related threats themselves, but rather in the emphasis placed on specific types of security threats. During the webinar, discussions on climate - related security issues primarily centered on development-related concerns, such as food and water security, rather than directly addressing the potential for climate-induced conflicts.



Caballero - Anthony (2024) mentioned that while ASEAN acknowledges the developmental consequences of climate change within its framework of comprehensive security, it has largely neglected the potential for climate change to exacerbate existing conflicts and destabilize the region. The focus has primarily been on development-oriented approaches, such as promoting sustainability and resilience, rather than directly addressing the security implications of climate change. The analysis criticizes the fragmented nature of climate change discussions within the ASEAN framework, noting that while climate change is addressed in various sectoral bodies under the socio-cultural pillar, a dedicated and coordinated approach is lacking. It emphasizes the need to integrate climate security considerations more fully into the political-security pillar of the ASEAN Community.

When regional sensitivities surrounding, climate security arise not from the acknowledgment of climate-related threats themselves, but rather from the emphasis placed on specific types of security concerns, the term “climate-related security” may be more suitable for facilitating effective communication and achieving desired policy outcomes.



2.3 Southeast Asia climate outlook and projected climate risks

The concept of global security is an integral part of the understanding of the way in which Southeast Asia takes up the urgent challenges posed by climate change. While the region undergoes serious impacts of environmental changes, global security extends beyond traditional military concerns to encompass economic stability, social cohesion and environmental resilience. This multifaceted approach allows the recognition of climate change as a major threat multiplier, exacerbating existing vulnerabilities within communities and states.



The response of Southeast Asia to climate change reflects an increasing recognition that food security, water management and human displacement due to environmental factors are all interconnected. Islam and Kieu (2020) point out that regional executives, such as the Association of Nations of Southeast Asia (ASEAN), play a central role in the navigation of these challenges by promoting cooperation between states members. These initiatives strengthen regional capacities to combat climatic impacts, emphasizing the need for a unified response which is closely aligned with the concept of global security.

The Global Climate Risk Index (GCRI) 2021 ranked countries in Southeast Asia based on the impact of extreme weather events experienced between 2000 and 2019 (Table 1). Notably, Timor-Leste was not included in this analysis. This ranking revealed a significant disparity in climate vulnerability within the region, with Myanmar

exhibiting high risk (ranked 2nd) and Singapore demonstrating low risk (ranked 179th) out of a global cohort of 180 countries. In contrast, the 2019 GCRI, which assessed climate risk across 182 countries (Table 2), categorized Indonesia at high risk (14th) and both Singapore and Brunei at low risk (130th) (Eckstein et al., 2021). These findings underscore the disproportionate vulnerability of Southeast Asian nations to climate change impacts. This necessitates the urgent development and implementation of robust climate policies, particularly for countries exhibiting high levels of climate risk both in the long term and on an annual basis, including Cambodia, Indonesia, Myanmar, the Philippines, Thailand, and Vietnam. However, given the transboundary nature of climate-related environmental issues, effective regional cooperation and concerted action are crucial for mitigating these challenges including those countries with low climate risk scores.

Table 1. The long-term Climate Risk Index from 2000 to 2019 in Southeast Asia (out of 180 countries)

CRI Rank	Rank in Southeast Asia	Country	CRI score	Fatalities in 2019	Fatalities per 100000 inhabitants	Losses in million US\$ (PPP)	Losses per unit GDP in %
176	9	Brunei	167.50	167	151	178	179
14	5	Cambodia	36.17	38	35	53	28
72	7	Indonesia	74.00	14	91	18	115
52	6	Lao PDR	60.50	82	66	73	38
116	8	Malaysia	405.67	64	108	66	144
2	1	Myanmar	10.00	1	1	19	19
4	2	Philippines	18.17	7	16	8	31
179	10	Singapore	172.00	172	172	162	177
9	3	Thailand	29.83	22	60	3	17
13	4	Vietnam	35.67	15	47	11	47

Table 2. The Climate Risk Index 2019 (out of 182 countries)

CRI Rank	Rank in Southeast Asia	Country	CRI score	Fatalities in 2019	Fatalities per 100000 inhabitants	Losses in million US\$ (PPP)	Losses per unit GDP in %
130	9	Brunei	118.00	167	106	130	130
84	7	Cambodia	75.83	38	63	97	86
14	1	Indonesia	24.83	14	31	6	39
45	6	Lao PDR	55.17	82	28	86	66
99	8	Malaysia	87.33	64	78	74	118
21	3	Myanmar	31.33	1	38	30	29
17	2	Philippines	26.67	7	40	15	26
130	9	Singapore	118.00	172	106	130	130
34	4	Thailand	43.17	22	64	19	38
38	5	Vietnam	50.17	15	57	32	65

Note: Timor-Leste was not included in this analysis

The Climate Risk Country Profile Report 2021, published by the World Bank Group and the Asian Development Bank (2021), projected a significant temperature increase in Southeast Asia by the 2090s. Under the highest emissions scenario, relative to the 1986-2005 baseline, temperature increases exceeding 3°C are anticipated in Cambodia, Lao PDR, Malaysia, and Vietnam. The analysis encompassed eight countries: Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines, Thailand, Timor - Leste, and Vietnam.



Flood, tropical cyclones, and drought were identified as the most prevalent climate-related natural hazards within the region. All Southeast Asian countries, excluding Timor-Leste, exhibited flood risk scores exceeding the global average. Furthermore, the region is projected to experience a higher frequency and intensity of tropical cyclones compared to the global average. Sea level rise is anticipated to be pronounced in coastal regions, particularly for island nations. Interestingly, the analysis revealed that most Southeast Asian countries demonstrated coping capacities that surpass the global average (European Commission, 2019).

The findings of the above analysis exhibit some congruence with the recent Southeast Asia Climate Outlook 2024 Survey Report (Seah et al., 2024). The survey identified floods (70.3%), heatwaves (51.8%), and landslides triggered by heavy rainfall (49.8%) as the three most significant climate-related threats within the region. A substantial proportion of Southeast Asians, approximately 60%, expressed strong belief that their lives would be significantly impacted by climate change within the next decade, while an additional 38.4% anticipate moderate impacts.



Regarding responsibility for addressing climate change, national governments were overwhelmingly perceived as bearing the greatest responsibility by a significant majority of respondents (79.7%). This was followed by the business and industrial sectors (55.9%) and subnational governments (52.7%).

The implementation of adaptive strategies to enhance climate security in regions prone to climate-related stress is crucial. Vietnam, for example, is highly vulnerable to sea-level rise. Projections indicate that without adaptation measures, approximately 12.7 million people would be affected by annual flooding in the coastal zone between 2070 and 2100. However, with the implementation of effective adaptation strategies, this number could be significantly reduced to 65.7 thousand people. Similarly, in Indonesia, without adaptation measures, an estimated 4.2 million people would be impacted by flooding. However, with the implementation of appropriate adaptation strategies, this number could be significantly reduced to 5.9 thousand people (World Bank Group and Asian Development Bank, 2021).



3. Conclusion and Recommendations

This article highlights the significant challenges posed by climate change in Southeast Asia, emphasizing the need for urgent and coordinated action to mitigate its impacts and enhance regional security. The evolution of terms such as

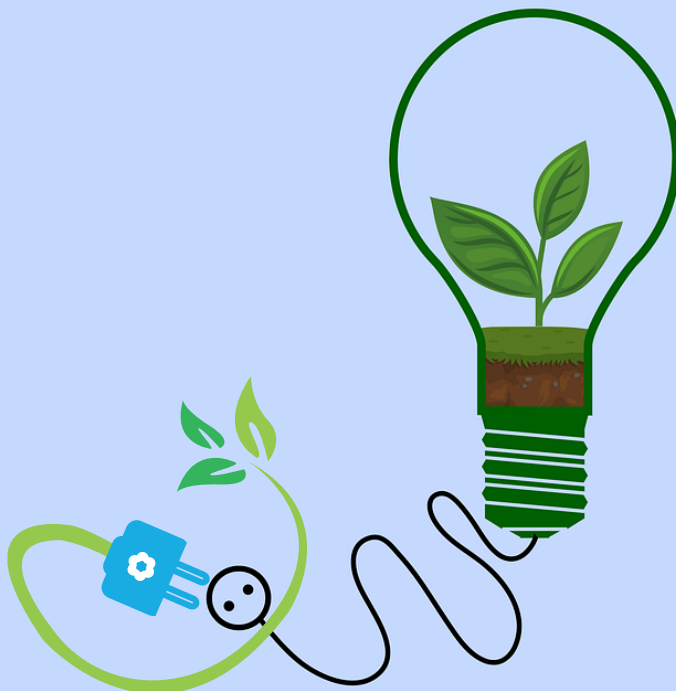
“environmental security” and “climate security”

highlights the need for precise terminological clarity to ensure effective policy responses. Although ASEAN has made strides in addressing climate-related risks, the fragmented nature of discussions and a lack of coordinated strategies remain significant obstacles.

The review emphasizes the need to move beyond a solely developmental approach to climate change within the Southeast Asian framework. While acknowledging the region's focus on development-oriented solutions, the analysis argues for a more integrated approach that explicitly addresses the security implications of climate change, including the potential for conflict, displacement, and resource scarcity.



The article also revealed significant disparities in climate vulnerability across Southeast Asia, with some countries facing extremely high risks from extreme weather events. The Climate Risk Country Profile Report projects substantial temperature increases in parts of the region by the 2090s, increasing the likelihood of floods, cyclones, and droughts. These findings align with public perception, as a recent survey reveals significant public concern about the impacts of climate change, particularly floods, heatwaves, and landslides. While most Southeast Asian countries demonstrate relatively strong coping capacities, the transboundary nature of climate change necessitates urgent and coordinated regional action, including robust climate policies and enhanced cooperation among all countries, regardless of their current risk levels. This is crucial to mitigate the escalating security risks associated with climate change impacts, such as resource scarcity, displacement, and potential for conflict.



Recommendations

1

Improve terminological clarity

Southeast Asian nations should strive to establish a consensus on terminology related to climate security to avoid ambiguity and foster consistent policy discourse. This can be achieved through interdisciplinary dialogues involving scientists, security experts, and policymakers to cultivate a shared understanding of climate-security challenges.

2

Prioritize resilience and adaptation strategies

Investment in climate-resilient infrastructure, such as flood defenses and drought-resistant agricultural systems, is crucial. The development and implementation of effective early warning systems for extreme weather events should be prioritized. The sharing of best practices in climate change adaptation and mitigation across the region must be enhanced.

3

Enhance national-level climate policies

Each Southeast Asian nation should tailor its national climate strategies to effectively address its unique vulnerabilities, such as sea-level rise and associated flooding risks in coastal areas.

4

Strengthen regional cooperation

ASEAN should establish a dedicated body within its framework to integrate climate security considerations into its political-security pillar. This dedicated body would facilitate effective coordination among member states in addressing transboundary climate challenges.

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