

Climate Security, Great Power Competition, and Adversarial Geopolitics in Southeast Asia

Conceptualization of Climate Security in Southeast Asia

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ABOUT THE PROJECT

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ABOUT START

The National Consortium for the Study of Terrorism and Responses to Terrorism (START) is a university-based research, education and training center comprised of an international network of scholars committed to the scientific study of terrorism, responses to terrorism and related phenomena. Led by the University of Maryland, START is a Department of Homeland Security Emeritus Center of Excellence that is supported by multiple federal agencies and departments. START uses state-of-the-art theories, methods and data from the social and behavioral sciences to improve understanding of the origins, dynamics and effects of terrorism; the effectiveness and impacts of counterterrorism and CVE; and other matters of global and national security. For more information, visit www.start.umd.edu or contact START at infostart@umd.edu.

ABOUT ARLIS

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Executive Summary

This report is a part of a larger desk study, “Climate Security, Great Power Competition, and Adversarial Geopolitics in Southeast Asia.” The larger study seeks to investigate the security challenges faced by Southeast Asian states arising from the intersection of climate change-related risks, vulnerabilities, and emerging geopolitical trends. The key outcomes emphasize that climate change in Southeast Asia extends beyond an environmental crisis, evolving into a systemic challenge poised to reshape the region’s geopolitical and economic dynamics, as well as human-environmental relationships at various geographic scales.¹

Introduction

Southeast Asia² is confronting the escalating impacts of climate change, which are exacerbating the vulnerabilities of an already fragile region. Southeast Asian states are grappling with the compounding effects of climate change and asymmetric threats, posing novel security risks to these states. The region remains highly susceptible to climate shocks and variabilities and is simultaneously experiencing a rapid growth in its urban population, which is expanding 1.75 times faster than urban areas in other world regions.³ In Southeast Asia, climate change is viewed as a threat multiplier, compounding existing insecurities.

In Southeast Asia, understanding and examining adversarial and environmental geopolitics⁴ requires consideration of three key observations:

- (1) Southeast Asian states are undergoing varying degrees of democratic backsliding, marked by the erosion of democratic values and the dissolution of democratic principles.
- (2) The region is witnessing a growing adversarial divide due to strategic competition, as the balance of power shifts among the United States, China, and Southeast Asian states, each pursuing their strategic interests.
- (3) The region is facing an escalating frequency and severity of climate change-related events, posing a threat to political stability and resource scarcity. This dynamic shapes how adversarial geopolitics influences environmental policy and practice, particularly in the realm of climate security.

This report will provide an in-depth review of scholarly research, including wider political and socio-cultural discourses, that analyze climate-related impacts in Southeast Asia. The purpose of this review

¹ The full desk study can be found here: Henkin, Samuel D. and Madeline Romm. 2023. *Climate Security, Great Power Competition, and Adversarial Geopolitics in Southeast Asia*. College Park, MD: START.

² Southeast Asia in this review is defined as Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

³ Yuen, B., & Ooi, G. L. (2009). Introduction: World Cities — Challenges of liveability, Sustainability and Vibrancy. In *Co-Published with Civil Service College Singapore and Institute of Policy Studies, National University of Singapore eBooks* (pp. 1–11).

⁴ O’Lear, S. (2018). *Environmental geopolitics*. Rowman & Littlefield; O’Lear, S. (2020). *Environmental geopolitics: An introduction to questions and research approaches*. In *A research agenda for environmental geopolitics* (pp. 1-14). Edward Elgar Publishing.

is to understand the discourse surrounding climate security in this region and how it translates into practice. Frames, defined as “schemata of interpretation,” help us comprehend issues based on pre-existing beliefs and value systems. Grasping the frame of climate security is critical for analyzing the intricate interplay among actors, institutions, and policies implemented to tackle security risks, due to climate change impacts, in Southeast Asia. Moreover, it is vital to explore how climate-related consequences might influence economic, scientific, and security concerns, and, therefore, responses to climate security challenges. This understanding is essential for advancing climate resilience and adaptation efforts in the region.

Data and Methodology

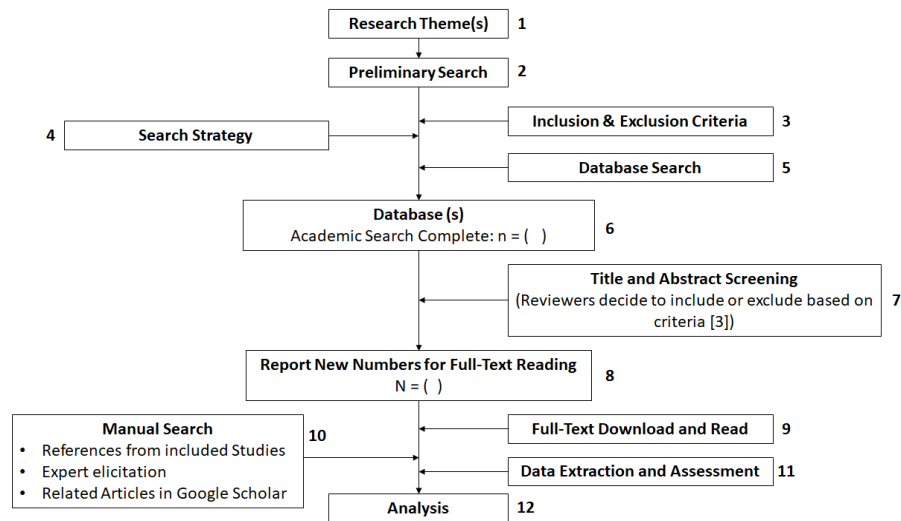
The research team meticulously designed a robust and comprehensive 12-stage methodology, as illustrated in Figure 1, below, to investigate and map how different conceptualizations of "climate security" serve geopolitical discourses: frameworks of meaning that offer perspective on the ways climate change is understood and addressed in Southeast Asia.⁵ Inclusion criteria were applied to ensure a focused review and analysis of the most pertinent source data. These criteria encompassed expert evaluations of research quality, including the robustness of theoretical frameworks, empirical assessments, and research methods; impact factors of scholarly articles; citation numbers; and publication dates - with a deliberate emphasis on recent works. Furthermore, stringent quality control measures were systematically implemented at each stage of the process to augment inter-coder reliability and bolster confidence in the results.

Search Strategy, Inclusion and Exclusion Criteria, and Database Search

To gather relevant sources, the research team confined their search to literature published between 2010 and 2022, focusing on Southeast Asia, to ensure relevance to the contemporary global landscape. Searches were conducted across two academic search engines, namely Google Scholar and Academic Search Ultimate. The scope encompassed peer-reviewed journal articles, magazines, and reports, with the aim of achieving comprehensive coverage including empirical studies and analyses of climate security. Additionally, the search parameters were limited to English-language publications. The search strings employed were: "Climate Security AND Southeast Asia OR ASEAN," "Climate Change AND Southeast Asia OR ASEAN," and "Environmental Security AND Southeast Asia OR ASEAN." After application of inclusion criteria, 296 texts were included in the final analysis.

⁵ Henkin, Samuel D. and Madeline Romm. 2023. Climate Security, Great Power Competition, and Adversarial Geopolitics in Southeast Asia. College Park, MD: START.

Figure 1. Source Data Search and Frame Review Protocol



Core Framing Tasks

Our review began by addressing fundamental framing tasks, including “diagnostic framing” for problem identification, “prognostic framing” for proposed solutions, and “motivational framing” for establishing the rationale for action. In essence, this process involves collectively defining and addressing an issue.⁶ Employing a thematic-based interpretive approach grounded in preliminary research, we addressed these core framing tasks to delve into the primary project theme of climate security. The initial screening and selection of source materials, as outlined in Table 1, guided our process.

Diagnostic framing. Previous literature discusses diagnostic framing as a process that involves identifying and defining a problem or injustice that needs to be addressed. It serves to diagnose or analyze the root causes of the issue at hand. Part of the diagnostic framing processes includes how movements identify victims of injustice and amplify their victimization, therefore framing the problem as one that requires attention and action and, ultimately, change.⁷ Within the context of climate security, the team identified the potential increase in risk and insecurity in Southeast Asia due to climate change-induced instability as the problem. By highlighting the potential consequences of climate change, such as increased instability and insecurity, this statement contributes to framing climate change as a significant problem that requires attention and action.

Prognostic framing. The second core framing task, prognostic framing, outlines proposed solutions or plans of action to address the identified problem. It effectively addresses the question, “What is to be done?” by offering concrete proposals for action, aiming to reach a consensus among stakeholders and mobilize action to enact the proposed solution.⁸ For climate change, suggested strategies include achieving climate security, economic stability through adaptation and resilience measures, and utilizing scientific data to guide collective efforts.

⁶ Snow, D.A. and Benford, R.D., 1988. Ideology, Frame Resonance, and Participant Mobilization. S. 197-217. Bert Klandermans; Hanspeter Kriesi; Sidney Tarrow; Benford, R.D. and Snow, D.A., 2000. Framing processes and social movements: An overview and assessment. *Annual review of sociology*, 26(1), pp.611-639.

⁷ Ibid.

⁸ Ibid.

Motivational framing. Motivational framing serves to motivate individuals to engage in collective action by providing compelling reasons or justifications for participating. By framing the issue in a motivational matter, often appealing to shared beliefs, values, and emotions, individuals are more likely to feel empowered and motivated to actively participate in addressing challenges.⁹ The escalating nature of climate change-related risks, emphasizing their growing duration, intensity, and impact, serves as a call to arms, motivating individuals to take action to address the urgent challenges posed by climate change.

This three-step process facilitated the identification of relevant source materials addressing the identified problem, actions needed, and the rationale for acting (or not) regarding climate change.

⁹ Ibid.

Table 1. Core Framing Tasks

<i>Diagnostic Framing: what is represented as the problem?</i>	<i>Prognostic Framing: what actions are needed?</i>	<i>Motivational Framing: what rationale to act (or not act) is given?</i>
To the extent that climate change continues unabated, increasing instability may lead to more risk and insecurity in Southeast Asia.	Climate security, economic stability through adaptation and resilience, and scientific data.	Increasing duration, intensity, and impact of climate change-related risks.

During the core framing tasks, the research team categorized frames into two main types: dominant frames and counter-frames. Dominant frames, established by authoritative figures, institutions, or widely recognized sources in the climate change field, exert significant influence over public opinion, policy decisions, and societal norms. They shape narratives, define problematics, and guide discourse on climate change by virtue of their authority, power, and expertise. Typically backed by expert knowledge derived from scientific research, institutional backing, or endorsements from authoritative figures, dominant frames play a pivotal role in shaping climate security policy and practice, offering guidance for actionable strategies. By analyzing dominant frames, we gain insights into prevailing trends used by experts to contextualize discussions on climate security in Southeast Asia. In contrast, counter-frames challenge dominant frames by providing alternative perspectives and solutions. Further granularity is achieved by considering frame supports during diagnostic and prognostic framing tasks. Frame supports, which bolster either dominant or counter-frames, align with their underlying arguments or objectives, thereby contributing to their strength and influence. Identifying frame supports aids in comprehending the broader context and dynamics surrounding the framing of climate change discourse.

Frame Typology

To explore how the current literature addresses the geopolitical aspects of climate change, our team systematically categorized source materials into two main categories: dominant frames and counter-frames. Analyzing dominant frames aligns with our core framing tasks, aiding in the identification, comprehension, and evaluation of key climate change issues, solutions, and motivations surrounding climate security discourse in Southeast Asia. The classification of dominant frames was established through an examination of the interconnectedness between climate security issues and sociopolitical factors, considering the broader social and political context in which these issues arise and are addressed. We identified three overarching dominant frames in climate security discourse: 1) Science; 2) Economics; and 3) Security.

Frame supports, identified within both dominant frames and counter-frames, refer to the issues, factors, and evidence that lend credibility to these frames within discourse. These supports strengthen and substantiate the claims made by a frame by providing additional context, evidence, or reasoning. With the dominant frames identified as science, economics, and security, frame supports encompass various elements that reinforce and validate these frames within the discourse on climate change in Southeast Asia.

Table 2. Climate Security Frame Typology

Dominant Climate Change Frame	Frame Supports
Security	• Conflict • Strategy/Strategic interests • Catastrophe • Uncertainty • Responsibility/Accountability • Adaptation • Vulnerability • Fragility
Economic	• Development • Economic consequences • Competition • Adaptation • Vulnerability • Fragility
Science	• Human interest • Scientific progress • Technology/Science • Uncertainty • Catastrophe • Responsibility/Accountability • Adaptation • Vulnerability • Fragility
Counter Frame (Alternative)	• Morality/Ethics • Social Progress

Dominant Security Frames. Security frames underscore the imperative of protecting both human and national security concerns. The perceived urgency of addressing climate change and its associated impacts as a critical security challenge validates the pursuit of strategic national security objectives by governments and international organizations. As the effects of climate change continue to unfold, security measures must adapt to effectively address emerging challenges. Therefore, literature that falls within the dominant security frame would include:

- Analyses, risk assessments, and scenario planning that explore the security implications of climate change-related threats, such as food insecurity, water scarcity, migration pressures, and geopolitical tensions in Southeast Asia;
- Endorsement by defense and intelligence communities, highlighting climate change as a national security threat and advocating for strategic responses to safeguard regional stability and security interests; and
- Advocacy for security policies, strategies, and capacity-building initiatives aimed at addressing climate-related risks, enhancing resilience, and fostering cooperation among stakeholders.

Dominant Economic Frames. Economic frames provide a perspective on climate change and its impacts primarily from a financial standpoint. These frames interpret climate change in terms of monetary consequences, focusing on factors like financial losses or gains, incurred costs, and economic outcomes related to various courses of action, whether implemented or not. In the literature, dominant economic frames are characterized by:

- Statistical analyses, economic models, and cost-benefit assessments that highlight the economic implications of climate change migration and adaptation measures in Southeast Asia;
- Support from businesses, industries, and economic experts advocating for climate action as a means to drive innovation, create green jobs, and enhance economic competitiveness in the region; and
- Proposed economic policies, incentives, and market-based mechanisms aimed at addressing climate change challenges and promoting sustainable development in Southeast Asia.

Dominant Scientific Frames. Scientific frames rely on scientific knowledge and authority to address climate change and its impacts. They establish credibility by offering insights into understanding climate change and its effects. These frames aim to identify the issues at hand and outline the necessary steps for addressing them, guiding actions to resolve the identified problems. Frame supports associated with scientific frames include:

- Scientific research, data, and findings regarding climate change impacts and trends in Southeast Asia;
- Support from climate scientists, environmental researchers, and scientific organizations endorsing the scientific consensus on climate change and its implications for the region; and
- Scientific assessments and recommendations for policy responses to mitigate climate change, adapt to its impacts, and promote sustainable development in Southeast Asia.

Counter-frames. Counter-frames aim to challenge or replace dominant frames by presenting their own perspectives on climate change and its associated impacts. They typically contest the dominance of prevailing frames and propose alternative interpretations to reshape understanding of climate change and its effects. Generally, counter frames seek to disrupt the hegemony of dominant perspectives and propose alternative ways of understanding climate change and its consequences.

Frame Results

Security Frames

Key findings:

1. *The climate-security nexus highlights the evolution in perceiving climate change as a notable national security concern, acknowledging its role as a threat multiplier that exacerbates existing insecurities, including human insecurity.*
2. *Climate-related diseases in Southeast Asia amplify existing health challenges, which strain the health and medical industry, posing significant human health and security concerns.*
3. *Food insecurity is one of the largest issues ASEAN nations are facing today. Climate shocks are affecting food availability, access to food, stability of food supplies, and food utilization.*
4. *Water security continues to be threatened as freshwater availability declines and health risks are exacerbated due to the utilization and consumption of wastewater.*
5. *Climate change is a vehicle that allows for or facilitates livelihood insecurity, migration and mobility, and exploitation by elite and rebel groups.*

Historically, climate change was exclusively discussed through scientific frames. However, now, much of the extracted literature investigates the relationship between climate change and security— the

so-called climate-security-nexus.¹⁰ As climate impacts become more frequent and severe, climate change can no longer be considered a phenomenon merely of scientific interest. Instead, climate change is now considered a national security threat, given that academics and practitioners are now witnessing climate-related threats impacts on security strategies. As Laksmana (2011) states, “while enormous energy and time were spent on establishing the scientific basis of climate change, there was less attention to its security ramifications.”¹¹ Climate security is expansive, comprising several disciplines, including foreign policy, military defense, economy, ecology, and the environment.¹² Climate security literature also refers to related issues as “non-traditional security challenges.”¹³ Furthermore, climate change-related risks are not solely focused on climate disasters but also on how they vary across location and impact.¹⁴ The overarching base on climate change-related security risks has investigated outcomes of climate impacts, including socioeconomic, political, military, food and water security risks, among others. As evidence indicates, Southeast Asia stands particularly susceptible to climate security risks, owing to its geographical positioning and existing vulnerabilities. Consequently, ASEAN states play a pivotal role in shaping discussions on climate security.

The ASEAN Regional Forum (ARF) initiated discussions surrounding climate security and brought it to the forefront of discourse in the last decade.¹⁵ The “ASEAN Declaration on Environmental Sustainability 2007” and the 2009 “Singapore Statement” followed, calling for immediate action, as ASEAN states were labeled as increasingly vulnerable to climate threats.¹⁶ Scholars specifically state that “in Southeast Asia, climate change has by and large been argued to be one of the key factors that is driving the region’s vulnerability to transnational threats, such as organized crime, terrorism, illicit trafficking, piracy, infectious diseases, and illegal migration flows.”¹⁷ Southeast Asia is unique to the climate security landscape, as it is vulnerable in several ways according to the Asian Climate Security Vulnerability Model 1.0 (ACSV).¹⁸ First, Southeast Asia is uniquely situated in a way that exposes these regions to intense and frequent climate-related hazards. Next, the region lacks resources and governmental capacity to adequately respond to climate impacts, resulting in low household and community resilience.¹⁹ As a result, Southeast Asia finds itself exceptionally vulnerable to climate risks compared to other regions in the world.²⁰

¹⁰ Daoudy, M. (2021). Rethinking the Climate–Conflict Nexus: A Human–Environmental–Climate Security approach. *Global Environmental Politics*, 1–22.

¹¹ Laksmana, E. A. (2011). *Climate Insecurities in Indonesia: Implications and Challenges for Defence Transformation*. S. Rajaratnam School of International Studies, 272. <http://www.jstor.org/stable/resrep17157>

¹² Krampe, F., & Mobjörk, M. (2018). Responding to Climate-Related Security Risks: Reviewing regional organizations in Asia and Africa. *Current Climate Change Reports*, 4(4), 330–337.

¹³ Chen, C., & Trias, A. P. L. (2020). *Water Security in Southeast Asia: Regional, National, and Sub-national Challenges*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep26885>; Chellaney, B. (2010b). Indian Ocean maritime security: energy, environmental and climate challenges. *Journal of the Indian Ocean Region*, 6(2), 155–168.

¹⁴ Feldmeyer, D., Birkmann, J., McMillan, J. M., Stringer, L. C., Filho, W. L., Djalante, R., Pinho, P., & Liwenga, E. T. (2021). Global vulnerability hotspots: differences and agreement between international indicator-based assessments. *Climatic Change*, 169(1–2).

¹⁵ Elliott, L. (2012). *Climate Change and Migration in Southeast Asia: Responding to a New Human Security Challenge*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep17163>

¹⁶ Krampe, F., & Mobjörk, M. (2018). Responding to Climate-Related Security Risks: Reviewing regional organizations in Asia and Africa. *Current Climate Change Reports*, 4(4), 330–337.

¹⁷ Laksmana, E. A. (2011). *Climate Insecurities in Indonesia: Implications and Challenges for Defence Transformation*. S. Rajaratnam School of International Studies, 1. <http://www.jstor.org/stable/resrep17157>

¹⁸ Busby, J. W., Smith, T. G., Krishnan, N., Wight, C., & Vallejo-Gutierrez, S. (2018). In harm’s way: Climate security vulnerability in Asia. *World Development*, 112, 88–118.

¹⁹ Ibid.

²⁰ Busby, J. W., Smith, T. G., Krishnan, N., Wight, C., & Vallejo-Gutierrez, S. (2018). In harm’s way: Climate security vulnerability in Asia. *World Development*, 112, 88–118.; Feldmeyer, D., Birkmann, J., McMillan, J. M., Stringer, L. C., Filho, W. L., Djalante, R., Pinho, P., & Liwenga, E. T. (2021). Global vulnerability hotspots: differences and agreement between international indicator-based assessments. *Climatic Change*, 169(1–2); Feldmeyer, D., Birkmann,

As mentioned, Asian states are experiencing human and health security challenges due to new and existing diseases beyond water and food-borne illnesses. Within this context, climate-related diseases act as a threat multiplier, compounding other infectious diseases in the region. In recent years, Asian states have encountered some of the deadliest diseases, further taxing the health and medical industry and challenging human health and security.²¹ ASEAN states have already endured widespread outbreaks of diseases and infections, including Severe Acute Respiratory Syndrome (SARS), avian influenza strains of H1-H5N1, and Middle East Respiratory Syndrome Coronavirus (MERS-CoV).²² These existing illnesses that plagued the region proved challenging for the government and health sector, apart from emerging climate-related illnesses.

Despite other human security issues, most of the sources with dominant security frames are often interested in water and food security following climate change-related impacts. As climate shocks and variabilities become more prominent and severe, communities, particularly less developed nations, face intense water and food shortages. Evidence suggests that particular ASEAN states are already experiencing issues with food security, such as the region's inability to match their rice production with its consumption, independent of climate change. The literature frames food security in four specific ways: 1) food availability, 2) access to food, 3) the stability of food supplies, and 4) food utilization.²³ For instance, in Indonesia, an existing law (Law No. 18/2012) addresses food security, sovereignty, and self-reliance.²⁴ This law presents specific mandates to regulate basic human needs concerning food availability and security. Specifically, the law specifies several points, including:

- (i) Improving the ability of producing food independently, (ii) providing diversified good, reaching the requirements of security-quality-nutrition for public food consumption, (iii) providing basic food at reasonable and affordable prices in accordance with the needs of the community, (iv) facilitating and improving food access to the community, and (v) increasing the added-value and competitiveness of food commodities.²⁵

With existing food insecurity, environmental degradation due to climate change has exacerbated food availability issues, such as rice production. States, like Thailand, have experienced extensive impacts on rice production as droughts and floods threaten available water to produce food.²⁶ As a result, ASEAN states, like Indonesia, cannot maintain sufficient production of goods for the community.²⁷ Livestock production is also jeopardized, as heat and disease outbreaks, due to changing temperatures and heat indexes, are contributing to a decline in overall production of healthy and reliable products.²⁸

J., McMillan, J. M., Stringer, L. C., Filho, W. L., Djalante, R., Pinho, P., & Liwenga, E. T. (2021). Global vulnerability hotspots: differences and agreement between international indicator-based assessments. *Climatic Change*, 169(1–2).

²¹ Alam, N., Chu, C., Li, Q., Crook, A., Whittaker, M., Aditama, T. Y., Schak, E., Budiman, D., Barber, B. L., & Lu, J. (2020). The Pearl River Declaration: a timely call for enhancing health security through fostering a regional one health collaboration in the Asia-Pacific. *Globalization and Health*, 16(1); Caballero-Anthony, M. (2018). Health and human security challenges in Asia: new agendas for strengthening regional health governance. *Australian Journal of International Affairs*, 72(6), 602–616.

²² Caballero-Anthony, M. (2018). Health and human security challenges in Asia: new agendas for strengthening regional health governance. *Australian Journal of International Affairs*, 72(6), 602–616.

²³ Lin, H., Yu, Y., Wen, F., & Liu, P. (2022). Status of food security in East and Southeast Asia and challenges of climate change. *Climate*, 10(3), 40.

²⁴ Widiyana, A., Wijaya, C., & Atmoko, A. W. (2022). The Challenges of Food Security Policy in Indonesia: Lesson Learned from Vietnam, India, and Japan. *Technium Social Sciences Journal*, 33, 1–15.

²⁵ Ibid., p. 3.

²⁶ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229–258. <http://www.jstor.org/stable/41288828>

²⁷ Widiyana, A., Wijaya, C., & Atmoko, A. W. (2022). The Challenges of Food Security Policy in Indonesia: Lesson Learned from Vietnam, India, and Japan. *Technium Social Sciences Journal*, 33, 1–15.

²⁸ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229–258. <http://www.jstor.org/stable/41288828>

Studies indicate that vulnerable regions are experiencing adverse effects on food production systems, resulting in reduced food availability and subsequent increases in food prices, thereby exacerbating the scarcity of food sources. In turn, this perpetuates poverty in regions dependent on farming and agriculture as a means to survival.²⁹ Mainly, these regions' food availability is impacted as food supply and demand are compounded by climate change impacts and the safeguarding of environmental resources.

These issues are not exclusive to particular regions, and in fact, food insecurity concerns all ASEAN states that are heavily dependent on water supply and either agriculture or aquaculture that is reliant on weather patterns. Specifically, the ASEAN region is experiencing direct and indirect impacts on fish availability due to climate change. The direct impacts “include changes in the abundance and distribution of fish species and an increase in the frequency and severity of extreme events, such as floods and storms, which affects fishing operations and infrastructure.”³⁰ Additionally, the indirect impacts “include changes in quantity and quality of aquatic habitat, ecosystem and productivity and the distribution and abundance of aquatic competitors and predators.”³¹ Southeast Asia is also experiencing changes to their coral reef that affect the food supply for fish stocks. We also see similar effects on shrimp production in Vietnam’s Mekong Delta.³² Overall, fish feed for fish and fish farmers’ supply of fish is and will be highly affected by changes in temperature, precipitation, ocean acidification, and sea level rise, which will, in turn, impact the supply chain, including traders, processors, manufacturers, distribution retail, and consumers.³³ Discourses pertaining to food security illustrates how water insecurity can also implicate food security and vice versa.

While it is clear that water and food insecurity are interrelated, discourse surrounding water insecurity also points to witnessing recognizable impacts on freshwater availability, resulting in heightened resource competition. Research shows that developed countries do not struggle to access drinking water and sanitation services at a large scale, while less developed countries struggle with basic services.³⁴ As of 2020, “close to three billion people in the region lack either potable water, adequate sanitation services and water infrastructure, and sufficient protection from water shortage.”³⁵ Many climate scholars are particularly concerned with blue water scarcity, which “refers to the freshwater availability in surface and groundwater bodies [that] can’t meet human water withdrawal.”³⁶ Water scarcity as a result of climate change is paramount as it threatens food scarcity, overall health, the economy, and ecological systems.³⁷ Experts often look to the water stress index (WSI) to measure and examine water scarcity conditions. In investigating WSI, evidence shows that water scarcity is rising, with the most impacted regions being Oceania, the Middle East, Southeastern Asia, Southern Asia,

²⁹ Lin, H., Yu, Y., Wen, F., & Liu, P. (2022). Status of food security in East and Southeast Asia and challenges of climate change. *Climate*, 10(3), 40.

³⁰ Teng, P., Lassa, J., & Caballero-Anthony, M. (2016). Climate Change and Fish Availability. *COSMOS*, 12(01), 35.

³¹ Ibid., p. 35.

³² Do, H., & Ho, T. Q. (2022). Climate change adaptation strategies and shrimp aquaculture: Empirical evidence from the Mekong; Tuấn, L. A., & Chinvanno, S. (2011). Climate change in the Mekong River Delta and key concerns on future climate threats. In *Advances in global change research* (pp. 207–217).

³³ Teng, P., Lassa, J., & Caballero-Anthony, M. (2016). Climate Change and Fish Availability. *COSMOS*, 12(01), 29–42; Caballero-Anthony, M. (2010). Climate change and human security in Southeast Asia: issues and challenges. In *Palgrave Macmillan UK eBooks* (pp. 393–413).

³⁴ Lin, H., Yu, Y., Wen, F., & Liu, P. (2022). Status of food security in East and Southeast Asia and challenges of climate change. *Climate*, 10(3), 40.

³⁵ Chen, C., & Trias, A. P. L. (2020). *Water Security in Southeast Asia: Regional, National, and Sub-national Challenges*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep26885>

³⁶ Huang, Z., Yuan, X., & Liu, X. (2021). The key drivers for the changes in global water scarcity: Water withdrawal versus water availability. *Journal of Hydrology*, 601, 126658; Liu, J., Yang, H., Gosling, S. N., Kummu, M., Flörke, M., Pfister, S., Hanasaki, N., Wada, Y., Zhang, X., Chen, K., Alcamo, J., & Oki, T. (2017). Water scarcity assessments in the past, present, and future. *Earth's Future*, 5(6), 545–559.

³⁷ Huang, Z., Yuan, X., & Liu, X. (2021). The key drivers for the changes in global water scarcity: Water withdrawal versus water availability. *Journal of Hydrology*, 601, 126658.

and North Africa. Also influencing water scarcity is water withdrawal, which has mainly affected developing countries, considering their lack of adequate irrigation systems.³⁸ It is predicted that if ASEAN does not implement water adaptation responses, most of the region will endure water stress.³⁹

In less developed countries that lack necessary irrigation and treatment facilities and experience negative impacts on water availability due to climate change, wastewater has become either more accessible or the only accessible source for those in these regions. As a result, farmers primarily rely on wastewater for irrigation, despite the potential deleterious consequences, like contamination and disease. Frankly, less developed nations that are dependent on agriculture as a means of work and their outputs as a source of food are compromising safety for food security.⁴⁰ This is increasingly becoming a concern in Southeast Asia as climate change-related risks impact freshwater sources. In fact, ASEAN states have been labeled as “emerging disease hotspots,” and scholars have begun paying particular attention to the direct and indirect impacts of poisoned water sources.⁴¹

Dickin et al.'s article reviewing 126 articles reported extensive health risks associated with wastewater irrigation and agriculture. The extracted literature that explored contamination via occupational pathways found that the related health risks included skin infections, dermatitis, fungal growth, ascariasis, diarrheal disease, giardiasis, health impacts linked to lead exposure, digestive and gastrointestinal illnesses, and hookworm.⁴² Additionally, scholars find that as a result of climate shocks, like landslides and flooding due to heavy rainfall, these states are experiencing runoff from landfills, further contaminating water.⁴³ Other studies that explored children living in wastewater irrigation areas or with parents exposed to wastewater, found that exposed groups experienced health related risks such as helminth infection, diarrheal disease, health risks linked to heavy metal, salmonella infection, and protozoan infection.⁴⁴ Increased utilization, contact, and consumption of wastewater encouraged the spread of infectious and skin diseases. Lastly, directly consuming contaminated food due to wastewater is linked to irritation of skin with black rashes and other reactions that may be linked to consuming heavy metals.⁴⁵ The escalating scarcity of freshwater due to climate change is rapidly transforming water security into a pressing national security concern, particularly evident in Southeast Asia where microbiological contaminants compound the challenge.⁴⁶

³⁸ Ibid.

³⁹ Fant, C., Schlosser, C. A., Gao, X., Strzepek, K., & Reilly, J. M. (2016). Projections of water stress based on an ensemble of socioeconomic growth and climate change scenarios: a case study in Asia. *PLOS ONE*, 11(3), e0150633.

⁴⁰ Dickin, S., Schuster-Wallace, C. J., Qadir, M., & Pizzacalla, K. (2016). A review of health risks and pathways for exposure to wastewater use in agriculture. *Environmental Health Perspectives*, 124(7), 900–909; Caballero-Anthony, M. (2010). Climate change and human security in Southeast Asia: issues and challenges. In *Palgrave Macmillan UK eBooks* (pp. 393–413).

⁴¹ Alam, N., Chu, C., Li, Q., Crook, A., Whittaker, M., Aditama, T. Y., Schak, E., Budiman, D., Barber, B. L., & Lu, J. (2020). The Pearl River Declaration: a timely call for enhancing health security through fostering a regional one health collaboration in the Asia-Pacific. *Globalization and Health*, 16(1), 2.

⁴² See “Dickin, S., Schuster-Wallace, C. J., Qadir, M., & Pizzacalla, K. (2016). A review of health risks and pathways for exposure to wastewater use in agriculture. *Environmental Health Perspectives*, 124(7), 900–909” for literature.

⁴³ Yahaya, N. S., Pereira, J. J., & Taha, M. R. (2021). Using best available information to conduct impact assessment of future climatic hazards on a landfill. *Climatic Change*, 165(3–4).

⁴⁴ See “Dickin, S., Schuster-Wallace, C. J., Qadir, M., & Pizzacalla, K. (2016). A review of health risks and pathways for exposure to wastewater use in agriculture. *Environmental Health Perspectives*, 124(7), 900–909” for literature.

⁴⁵ See “Dickin, S., Schuster-Wallace, C. J., Qadir, M., & Pizzacalla, K. (2016). A review of health risks and pathways for exposure to wastewater use in agriculture. *Environmental Health Perspectives*, 124(7), 900–909; Caballero-Anthony, M. (2010). Climate change and human security in Southeast Asia: issues and challenges. In *Palgrave Macmillan UK eBooks* (pp. 393–413)” for literature.

⁴⁶ Davies, G. I., McIver, L., Kim, Y., Hashizume, M., Iddings, S., & Chan, V. S. (2014). Water-Borne Diseases and Extreme Weather Events in Cambodia: Review of impacts and implications of climate change. *International Journal of Environmental Research and Public Health*, 12(1), 191–213; Dickin, S., Schuster-Wallace, C. J., Qadir, M., & Pizzacalla, K. (2016). A review of health risks and pathways for exposure to wastewater use in agriculture. *Environmental Health Perspectives*, 124(7), 900–909; Caballero-Anthony, M. (2010). Climate change and human security in Southeast Asia: issues and challenges. In *Palgrave Macmillan UK eBooks* (pp. 393–413).

Consequently, grappling with water scarcity, this region is forced to adopt insufficient sanitation and hygiene measures, intensifying the transmission of infectious diseases and burdening healthcare systems. This strain on healthcare infrastructure not only disrupts economic productivity but also fuels social and political unrest, presenting significant national security risks.

As discussed, security frames often encompass and focus on indirect threats, such as stressors to resources, including water and food, which challenge the state's security. Other research investigates direct security issues, including climate-induced disasters' effects on military capability. The 2008 ARF Defence Officials' Dialogue identified military officials and personnel as having a key role in dealing with climate-related consequences, even calling for the military to adjust their traditional security measures to non-traditional security responses.⁴⁷ Laksmana (2011) specifically explored military ramifications, which have largely been absent from the literature.⁴⁸ While the military is already responsible for large-scale risks apart from climate change, climate change consequences present novel uncertainties that are tacked onto the military's existing responsibilities. Now, military organizations are confronted with "humanitarian crises, large-scale disasters, social unrest, and even border protection."⁴⁹ Additional climate stressors further tax governmental sectors and infrastructure.

In countries like Myanmar, the government's response to climate change has been hindered by challenges such as a military coup, which diverted attention and resources away from climate efforts and strained governmental capacity.⁵⁰ Amidst this political upheaval, the nation's vulnerability to climate impacts is heightened, amplifying the urgency of addressing environmental challenges. This upheaval compounds the country's vulnerability to climate impacts, which are expected to exacerbate climate-induced migration, water and food scarcity, resource depletion, disease outbreaks, and natural disasters. As a result, the military, which plays a significant role in governance, will be compelled to address these multifaceted challenges. The intersection of political instability and environmental vulnerability present complex obstacles that require strategic solutions. Specifically, military organizations will need to adapt their infrastructure and strategies to cope with heightened climate shocks and variabilities. They will also be tasked with providing humanitarian aid and disaster relief in the aftermath of climate-related events.⁵¹ The convergence of political turmoil and environmental challenges presents a pressing obstacle in addressing climate concerns effectively. With resources diverted towards conflict resolution and maintaining stability, military organizations must reassess and reorganize their priorities to balance traditional military operations with climate-related efforts.

Moreover, climate impacts are triggering energy crises, intensifying relational challenges, particularly concerning energy security. As energy becomes increasingly critical, governments grapple with the task of formulating comprehensive strategies to address the energy crisis, given its extensive implications across different sectors.⁵² For example, while dam construction has historically been a key source of energy production in the Mekong River, it has also sparked disputes over environmental

⁴⁷ Busby, J., Smith, T., Kirshnan, N., & Wight, C. (2016). Climate Security Vulnerability in Asia 1.0. In *The Robert S. Strauss Center for International Security and Law*. https://strausscenter.org/wp-content/uploads/cepsa/CEPSA_Vulnerability_Brief-1.pdf; Elliott, L. (2012). *Climate Change and Migration in Southeast Asia: Responding to a New Human Security Challenge*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep17163>; Chellaney, B. (2010). Indian Ocean maritime security: energy, environmental and climate challenges. *Journal of the Indian Ocean Region*, 6(2), 155–168.

⁴⁸ Laksmana, E. A. (2011). *Climate Insecurities in Indonesia: Implications and Challenges for Defence Transformation*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep17157>

⁴⁹ Ibid. p. 272.

⁵⁰ Hamilton-Hart, N. (2021). Climate change governance in Singapore. In *Routledge eBooks* (pp. 148–167).

⁵¹ Laksmana, E. A. (2011). *Climate Insecurities in Indonesia: Implications and Challenges for Defence Transformation*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep17157>

⁵² Simpson, A., & Smits, M. (2016). Transitions to energy and climate security in Thailand. In *Routledge eBooks* (pp. 296–311); Chellaney, B. (2010). Indian Ocean maritime security: energy, environmental and climate challenges. *Journal of the Indian Ocean Region*, 6(2), 155–168.

resources at both national and international levels. These conflicts have ripple effects, impacting access to natural resources and livelihoods at the local level by disrupting migration routes, flood patterns, and wetland ecosystems, ultimately affecting food availability and production.⁵³ The need for sustainably energy solutions is paramount to address environmental and social concerns. Overall, the compounding effects of climate change and governance challenges in less developed nations underscores the urgent need to robust responses to address climate-related threats effectively. Achieving resilience in the face of these challenges will require coordinated action, innovative solutions, and adaptive governance structures.

While developed nations may possess the resources to address security concerns, regions like Southeast Asia often lack the means to respond effectively. Due to various vulnerability factors, Southeast Asia faces greater challenges in building resilience against climate-related disasters compared to other regions. Studies highlight the inadequate governmental capacity of countries like Myanmar, Laos, and Nepal when contrasted with their ASEAN counterparts.⁵⁴ Moreover, research indicates that the Philippines' weak governance and state fragility, compounded by environmental impacts, may lead to eventual state failure.⁵⁵ In other words, climate change acts as a "burden multiplier," exacerbating existing security threats.⁵⁶ For instance, anticipated increases in intra- and interstate conflict stem from heightened competition over resources in environments vulnerable to climate change impacts.⁵⁷ Research in the Philippines has revealed a correlation between rapid shifts from wet to dry seasons, attributed to climate change, and a rise in civil conflict incidents. It is projected that ASEAN countries will experience a surge in civil conflict due to intensified climate impacts.⁵⁸ Furthermore, the strain of climate-related hazards on fragile countries like those in Southeast Asia taxes governmental infrastructure, leading to increased local grievances if basic needs are unmet or if individuals are forced to compete for natural resources.⁵⁹ Human rights violations, such as the killing of environmentalists, have been reported in the Philippines, particularly during the Duterte administration, and are expected to worsen as climate impacts escalate.⁶⁰

As civil conflict increases, regions become increasingly more unstable and, therefore, more vulnerable to threats. Threats include leading states like China that exploit insecurities to gain political leverage.⁶¹ Similarly, powerful elite groups are capitalizing on resource insecurity by stockpiling the remaining

⁵³ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 236. <http://www.jstor.org/stable/41288828>

⁵⁴ Busby, J. W., Smith, T. G., Krishnan, N., Wight, C., & Vallejo-Gutierrez, S. (2018). In harm's way: Climate security vulnerability in Asia. *World Development*, 112, 88–118.

⁵⁵ Holden, W. N. (2022). Climate change, neoauthoritarianism, necropolitics, and state failure: the Duterte regime in the Philippines. *Asian Geographer*, 40(2), 145–167.

⁵⁶ Laksmiana, E. A. (2011). *Climate Insecurities in Indonesia: Implications and Challenges for Defence Transformation*. S. Rajaratnam School of International Studies, 273. <http://www.jstor.org/stable/resrep17157>

⁵⁷ Krampe, F., & Möbjörk, M. (2018). Responding to Climate-Related Security Risks: Reviewing regional organizations in Asia and Africa. *Current Climate Change Reports*, 4(4), 330–337; Chellaney, B. (2010). Indian Ocean maritime security: energy, environmental and climate challenges. *Journal of the Indian Ocean Region*, 6(2), 155–168; Cheong, D. (2022, February 21). 2022/15 "Examining Climate-Conflict Links in Southeast Asia" by Darren Cheong - ISEAS-Yusof Ishak Institute. ISEAS-Yusof Ishak Institute. <https://www.iseas.edu.sg/articles-commentaries/iseas-perspective/2022-15-examining-climate-conflict-links-in-southeast-asia-by-darren-cheong/#:~:text=These%20case%20studies%20demonstrate%20that,elite%20exploitation%20leading%20to%20conflict.>

⁵⁸ Crost, B., Duquenois, C., Felter, J. H., & Rees, D. I. (2018). Climate change, agricultural production and civil conflict: Evidence from the Philippines. *Journal of Environmental Economics and Management*, 88, 379–395.

⁵⁹ Elliott, L. (2017). Environmental regionalism: moving in from the policy margins. *The Pacific Review*, 30(6), 952–965.

⁶⁰ Holden, W. N. (2022). Climate change, neoauthoritarianism, necropolitics, and state failure: the Duterte regime in the Philippines. *Asian Geographer*, 40(2), 145–167.

⁶¹ Chen, C., & Trias, A. P. L. (2020). *Water Security in Southeast Asia: Regional, National, and Sub-national Challenges*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep26885>

resources as a means of control and power.⁶² Additionally, there is evidence to suggest that “when the state is weak, unable or unwilling to provide relief, and reluctant to work with international actors, more space is left for” rebel groups to capitalize on disasters and recruit victims.⁶³ Research indicates that governmental capacity and presence is a significant mechanism in understanding the pathway from climate-related disasters to rebel recruitment. When government actors were present, rebel groups’ recruitment was abated.⁶⁴ These factors have tremendous political and social implications when an already vulnerable and less developed nation is grappling with a societal breakdown, including issues with resource management, migration, and conflict. Specifically, “whether exposure to climate hazards translate into large-scale loss of life in specific places hinges crucially on their social factors and the relationship between citizens and their governments.”⁶⁵ Governments are responsible for supplying aid for their population and equally dispersing existing resources while minimizing internal and civil conflict and grievances, otherwise, residents’ livelihoods become impractical.⁶⁶

More recent research has investigated the concept of “cascading displacement,” which has largely been absent from migration literature.⁶⁷ Cascading displacement refers to “an extreme consequence of climate and disaster vulnerability redistribution in which the displacement and subsequent relocation, or potential relocation, of one group can lead to the increased insecurity and eventually displacement, or fear of displacement, of other groups inhabiting the land or neighboring land selected for the relocation site.”⁶⁸ In other words, voluntary or involuntary displacement has a spillover effect, where host countries and residents are experiencing insecurity as a result of those migrating. These groups of people have also been referred to as environmental migrants in literature.⁶⁹ Through analyzing Fiji and the Philippines, two countries heavily impacted by climate change, Johnson et al. (2022) identified three experiences as a result of cascading displacement: (1) land insecurity; (2) livelihood insecurity; and (3) perceptions of conflict, disorder, and crime.⁷⁰ Their case study revealed that in both locations, residents from the host country experienced feelings of marginalization and potential displacement themselves due to climate-induced migration. Thus, the authors concluded that relocating climate-affected communities might not be a favorable adaptation strategy, considering vulnerability tends to be redistributed to the receiving country.⁷¹ There is also rare literature that discusses environmental displacement in the Pacific nations that may spill over into ASEAN states, where Southeast Asia may

⁶² Krampe, F., & Mobjörk, M. (2018). Responding to Climate-Related Security Risks: Reviewing regional organizations in Asia and Africa. *Current Climate Change Reports*, 4(4), 330–337; Cheong, D. (2022, February 21). 2022/15 “Examining Climate-Conflict Links in Southeast Asia” by Darren Cheong - ISEAS-Yusof Ishak Institute. ISEAS-Yusof Ishak Institute. <https://www.iseas.edu.sg/articles-commentaries/iseas-perspective/2022-15-examining-climate-conflict-links-in-southeast-asia-by-darren-cheong/#:~:text=These%20case%20studies%20demonstrate%20that,elite%20exploitation%20leading%20to%20conflict.>

⁶³ Walch, C. (2018). Weakened by the storm: Rebel group recruitment in the wake of natural disasters in the Philippines. *Journal of Peace Research*, 55(3), 347. <https://www.jstor.org/stable/48595887>

⁶⁴ Walch, C. (2018). Weakened by the storm: Rebel group recruitment in the wake of natural disasters in the Philippines. *Journal of Peace Research*, 55(3), 336–350. <https://www.jstor.org/stable/48595887>; Krampe, F., & Mobjörk, M. (2018). Responding to Climate-Related Security Risks: Reviewing regional organizations in Asia and Africa. *Current Climate Change Reports*, 4(4), 330–337.

⁶⁵ Busby, J. W., Smith, T. G., Krishnan, N., Wight, C., & Vallejo-Gutierrez, S. (2018). In harm’s way: Climate security vulnerability in Asia. *World Development*, 112, 89.

⁶⁶ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229–258. <http://www.jstor.org/stable/41288828>

⁶⁷ Johnson, K., Mortensen, S., Gueguen-Teil, C., & Torre, A. R. (2021). Displaced by climate and disaster-induced relocations: experiences of cascading displacement in Fiji and the Philippines. *Disasters*, 46(2), 499–525.

⁶⁸ Ibid., p. 504.

⁶⁹ Elliott, L. (2012). *Climate Change and Migration in Southeast Asia: Responding to a New Human Security Challenge*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep17163>

⁷⁰ Johnson, K., Mortensen, S., Gueguen-Teil, C., & Torre, A. R. (2021). Displaced by climate and disaster-induced relocations: experiences of cascading displacement in Fiji and the Philippines. *Disasters*, 46(2), 499–525.

⁷¹ Ibid.

have a moral and ethical responsibility to help their vulnerable neighbors, further taxing ASEAN governments.⁷² However, other evidence suggests that cooperation between the Pacific and Southeast Asia can aid disaster management.⁷³ Nonetheless, issues surrounding migration will likely heighten in the near future, considering predictions that climate change will influence mass migration, with up to 143 million internal climate migrants by 2050, due to environmental impacts.⁷⁴ As more people migrate to and infiltrate host countries, social conflict may arise, natural resources will likely be spread thin, and government assistance and resources will likely be strained. Despite evidence showing the consequences of climate-induced migration, it remains understudied in literature.⁷⁵

Based on the security threats mentioned above, ASEAN states are increasingly being forced to produce adaptation plans. For instance, with a historically successful energy sector in these regions, climate-related risks are upsetting energy trade, production, and consumption, as these means are no longer feasible in this climate.⁷⁶ It was not until recently that energy security discussions were incorporated into adaptation and resilience planning.⁷⁷ Thus, ASEAN adaptation responses and policies must reflect potential security threats while protecting economic growth. Through focus groups exploring climate adaptation planning, Palermo and Hernandez (2020) found the groups highlighted the need for stakeholder and citizen organizations, such as government agencies, business organizations, NGOs, and neighborhood associations, that are essential in implementing adaptation plans, which is consistent with existing literature.⁷⁸ Respondents noted that Southeast Asian governments lack the capacity to handle climate-related hazards independently and should rely on stakeholder and citizen involvement throughout the process, which reflects citizens' needs. This is known as community-based climate change adaptation or “safety walks,” which require “technical expertise to be integrated with the viewpoint of people who are living in the territory and experiencing disasters.”⁷⁹ It is essential for policies to fit at the local level, not exclusively at the national level.⁸⁰

Moreover, with carbon dioxide emissions rising in Southeast Asia due to electricity and heat production, ASEAN states have adopted various adaptation policies to reduce these emissions. Specifically, Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam have introduced policies, acts, and laws and have implemented

⁷² Tabucanon, G. M. (2013). An alternative home? ASEAN and Pacific Environmental migration. *Cosmopolitan Civil Societies: An Interdisciplinary Journal*, 5(1), 19–38.

⁷³ Cook, A. D. B., & Chen, C. (2020). Disaster governance and prospects of inter-regional partnership in the Asia-Pacific. *The Pacific Review*, 35(3), 446–476; Tangney, P., Nettle, C., Clarke, B., Newman, J., & Star, C. (2021). Climate security in the Indo-Pacific: a systematic review of governance challenges for enhancing regional climate resilience. *Climatic Change*, 167(3–4).

⁷⁴ Marthin, A., & Budiman, L. (2020). The discourse of climate migration: Unravelling the politics of ASEAN's environmental policies. *Pacific Journalism Review*, 26(2), 35–51.

⁷⁵ Ibid.

⁷⁶ Seah, Sharon. "Climate Change: Southeast Asia's Existential Threat." *Southeast Asian Affairs*, vol. 2022, 2022, p. 73–88. Project MUSE muse.jhu.edu/article/855264.

⁷⁷ Simpson, A., & Smits, M. (2016). Transitions to energy and climate security in Thailand. In *Routledge eBooks* (pp. 296–311).

⁷⁸ Rum, M. (2016). The case of Regional Disaster Management Cooperation in ASEAN: A constructivist approach to understanding how international norms travel. *Southeast Asian Studies*, 5(3), 491–514; Palermo, V., & Hernández, Y. (2020). Group discussions on how to implement a participatory process in climate adaptation planning: a case study in Malaysia. *Ecological Economics*, 177, 106791; *Climate Security in Mainland Southeast Asia: A Scenarios-Based Assessment*. (2023, January 5). The Center for Climate & Security. <https://climateandsecurity.org/reports/climate-security-in-mainland-southeast-asia-a-scenarios-based-assessment/>

⁷⁹ Palermo, V., & Hernández, Y. (2020). Group discussions on how to implement a participatory process in climate adaptation planning: a case study in Malaysia. *Ecological Economics*, 177, 106791; Djalante, R., & Thomalla, F. (2012). Disaster risk reduction and climate change adaptation in Indonesia. *International Journal of Disaster Resilience in the Built Environment*, 3(2), 166–180.

⁸⁰ Cook, Alistair & Chen, Christopher. (2019). Disaster Governance in the Southwest Pacific: Perspectives, Challenges, and Future Pathways for ASEAN; Djalante, R., & Thomalla, F. (2012). Disaster risk reduction and climate change adaptation in Indonesia. *International Journal of Disaster Resilience in the Built Environment*, 3(2), 166–180.

renewable energies that can contribute to reducing carbon dioxide emissions in the region. Regarding sustainable development, ASEAN has already initiated several efforts to aid in disaster management, including the establishing the ASEAN Committee on Disaster Management (ACDM) and the Agreement on Disaster Management and Response (AADMER). These committees assist in regional cooperation between ASEAN states to better respond to and manage disasters.⁸¹ Other strategies have capitalized on technology, including the launch of Project Agos and PetaBencana.id, platforms where multiple actors can correspond and share information on disasters like flooding.⁸² As an already vulnerable region to climate change, research suggests that it is essential for Southeast Asia to address these issues and prioritize preventative measures.⁸³

Overall, ASEAN's framing of climate-related security risks now focuses on disaster management, including resilience to climate shocks and variability, and food security. ASEAN emphasizes human security in the context of peace and stability.⁸⁴ Specifically, research reveals ASEAN's explicit framing of climate security as such:

Climate change is seen as a risk to prosperity and stability in the region. The impacts climate change has on livelihood conditions and development options are in focus. ASEAN has set out a vision for community resilience to climate change and supports national and global efforts to combat climate change.⁸⁵

As a result, ASEAN's action against climate change includes strengthening resilience in the agricultural sector, disaster management, and particularly resilience in coastal cities. ASEAN calls for aid from donors like Australia, Japan, and the EU, and policymakers are proposing a joint effort in disaster management between governments like the Southwest Pacific.⁸⁶ However, evidence suggests that some nations are hesitant to participate in regional cooperation, fearing intelligence sharing and lacking sufficient management over relief strategies.⁸⁷ Regardless, studies show that regional cooperation is essential in disaster management.⁸⁸ Despite action against climate change impacts, a comprehensive understanding of climate security risks is lacking in this region of the world.⁸⁹

The ways in which climate change is framed in discourse are essential to creating adaptation plans, strategies, and policies. As discussed, historically, climate change has been framed as a scientific experience that stunts governmental responses. Discourse surrounding climate security frames climate change as a human security issue to mobilize security measures at the global level. This security framing provides a more holistic approach, where language surrounding climate change motivates

⁸¹ Lucero-Prisno, D. E. (2014). Disasters, resilience, and the ASEAN integration. *Global Health Action*, 7(1).

⁸² Chen, C., & Trias, A. P. L. (2020). *Water Security in Southeast Asia: Regional, National, and Sub-national Challenges*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep26885>

⁸³ Lee, Z. H., Sethupathi, S., Lee, K. T., & Bhatia, S. (2013). An overview on global warming in Southeast Asia: CO 2 emission status, efforts done, and barriers. *Renewable & Sustainable Energy Reviews*, 28, 71–81.

⁸⁴ Krampe, F., & Mobjörk, M. (2018). Responding to Climate-Related Security Risks: Reviewing regional organizations in Asia and Africa. *Current Climate Change Reports*, 4(4), 330–337.

⁸⁵ Ibid., p. 336.

⁸⁶ Cook, A. D. B., & Chen, C. (2020). Disaster governance and prospects of inter-regional partnership in the Asia-Pacific. *The Pacific Review*, 35(3), 446–476

⁸⁷ Di Floristella, A. P. (2015). Dealing with natural disasters. *The Pacific Review*, 29(2), 283–305.

⁸⁸ Rum, M. (2016). The case of Regional Disaster Management Cooperation in ASEAN: A constructivist approach to understanding how international norms travel. *Southeast Asian Studies*, 5(3), 491–514; Kranz, N., Menniken, T., & Hinkel, J. (2010). Climate change adaptation strategies in the Mekong and Orange-Senqu basins: What determines the state-of-play? *Environmental Science & Policy*, 13(7), 648–659; *Climate Security in Mainland Southeast Asia: A Scenarios-Based Assessment*. (2023, January 5). The Center for Climate & Security. <https://climateandsecurity.org/reports/climate-security-in-mainland-southeast-asia-a-scenarios-based-assessment/>

⁸⁹ Krampe, F., & Mobjörk, M. (2018). Responding to Climate-Related Security Risks: Reviewing regional organizations in Asia and Africa. *Current Climate Change Reports*, 4(4), 330–337.

nations to work towards a sustainable future.⁹⁰ As recent literature suggests, framing climate change as a national security issue provides insight into how climate change impacts regions beyond science and encourages practitioners to consider climate change a threat to global stability, geopolitical relations, and human security.

Economic Frames

Key findings:

1. *Heat related work productivity loss is increasingly becoming an issue within these regions as temperatures continue to rise.*
2. *Climate change impacts will likely re-shape the tourism industry, further harming economic prosperity in Southeast Asia.*
3. *New climate policies, adaptation, and resilience plans implemented to decrease gas and fossil fuel emissions, and to mitigate overall climate impacts, may be negatively impacting economies.*

The climate change-related threats explained above in our security frame are also having observable impacts on Southeast Asia's economy. It is important to note that ASEAN is projected to become the world's fourth-largest economy by 2030, likely due to the energy sector, with accompanying greenhouse emissions. Southeast Asia's tourism industry is also flourishing, therefore generating significant economic outputs and creating jobs. However, ASEAN recognizes that with improvements to the economy, coupled with climate change impacts, the region will likely need to rethink or reformulate ways in which to grow their economy.⁹¹

First, with global average temperatures steadily rising, devastating impacts on workers' health and productivity are noticeable.⁹² Studies suggest that heat stress negatively affects work rates, as internal body temperature increases at work resulting in potential physical and mental health consequences. It is also important to recognize that the effects of heat stress on work productivity vary across geographical locations. In fact, from a global online survey on heat wave-related work productivity loss (WPL), Shuang et al. (2019) found that the average WPL due to heat stress is around 6.6 days for developing countries compared to 3.5 days for developed countries.⁹³ Significantly, the most vulnerable region, Southeast Asia, could experience more than two months of WPL due to heat stress. We are likely to see WPL continue to rise as global temperatures also continue to increase, meaning that regions susceptible to heat stress, like Southeast Asia, will experience repercussions to their economy as WPL increases simultaneously.⁹⁴ Apart from heat stress, ASEAN states are experiencing overall impacts to work productivity, as crop and aquaculture outputs dwindle. For instance, the 2010 drought in Thailand significantly decreased water levels in the Mekong River, therefore impacting fishing trips, which are critical employment opportunities in the region.⁹⁵ As climate-induced disasters

⁹⁰ Morrissey, J. (2020). Mobilising the language of emergency: human security and climate action discourse. *Irish Studies in International Affairs*, 31, 59.

⁹¹ Shadman, F., Sadeghipour, S. M., Moghavvemi, M., & Saidur, R. (2016). Drought and energy security in key ASEAN countries. *Renewable & Sustainable Energy Reviews*, 53, 50–58.

⁹² Shuang, Y., Jiangjiang, X., Zhongwei, Y., Anzhi, Z., Yang, X., Dabo, G., Jiarui, H., Jun, W., Liang, C., & Yakun, L. (2019). Loss of work productivity in a warming world: Differences between developed and developing countries. *Journal of Cleaner Production*, 208, 1219–1225.

⁹³ Ibid.

⁹⁴ Ibid.

⁹⁵ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229–258. <http://www.jstor.org/stable/41288828>

affect employment opportunities, it will further tax livelihoods as many workers in less developed countries lack the means to seek alternative employment.⁹⁶

In addition to WPL affecting individuals' financial security, scientific frames (discussed below) predict that climate change-related risks will likely reshape the tourism industry in Southeast Asia, with potentially dire economic consequences. While climate impacts are changing the landscape of the tourism industry, tourism is also contributing to global warming. Historically, Southeast Asia's tourism industry is a large contributor to its economy. In particular, Luang Prabang in Laos is one of the leading tourist destinations as it is labeled a World Heritage site by the United Nations Educational, Scientific, and Cultural Organisation. There has also been a steady increase in tourist arrivals, which is expected to exceed 6.9 million visitors by 2025, which is contributing significantly to greenhouse gas emissions. Furthermore, in Thailand, the government initiated measures to alleviate and reduce deforestation. This action was prompted by concerns arising from the adverse impacts of tourism, along with transportation activities and fisheries, on coastal erosion, as well as the depletion of fish stocks, coastal reefs, and wetlands.⁹⁷ As this industry continues to grow, so will emissions, further compounding natural disasters.

As climate change intensifies, the tourism industry is expected to face both direct and indirect consequences. Indirect impacts occur when climate-related factors such as extreme weather events, rising sea levels, or shifts in temperature patterns affect the conditions travelers consider when planning trips. This can involve changes in ecosystems or landscapes that affect a destination's appeal, as well as scarcity of food, water, and resources that impact overall attractiveness and safety. Examples of indirect effects often point to resource scarcity. For instance, climate change is significantly impacting food availability in the Mekong River region, exacerbated by population growth and tourism.⁹⁸ ASEAN countries are witnessing significant declines in food production and distribution due to climate change and population growth, particularly affecting farmers and coastal communities.⁹⁹ Consequently, ASEAN governments are compelled to stabilize food prices to ensure affordability. As tourism in ASEAN continues to grow, leading to increased population density, these areas will face heightened resources scarcity and greenhouse gas emissions. To address challenges to resource availability, regions will need to implement costly measures to mitigate tourism impacts. This might involve building more resilient infrastructure or implementing policies and strategies to address climate impacts and population growth, further complicating the tourism industry.¹⁰⁰

Although less documented, direct impacts on the tourism industry occur when climate-related factors have an immediate effect on tourism activities and infrastructure. For example, Thailand has experienced direct impacts such as coastal erosion, destruction of mangroves and coral reefs, and coral bleaching due to sea-level rise, driving tourists away from affected areas. The loss of mangroves and coral reefs exposes coastal regions to increased climate shocks, damaging infrastructure and reducing beach space. Additionally, the loss of biodiversity from damaged coral reefs has led to the closure of dive sites, discouraging tourism. In response, the Thailand tourism industry has taken steps to promote

⁹⁶ Nuorteva, P., Keskinen, M., & Varis, O. (2010). Water, livelihoods and climate change adaptation in the Tonle Sap Lake area, Cambodia: learning from the past to understand the future. *Journal of Water and Climate Change*, 1(1), 87–101.

⁹⁷ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229–258. <http://www.jstor.org/stable/41288828>;

⁹⁸ Yuen, B., & Ooi, G. L. (2009). Introduction: World Cities — Challenges of liveability, Sustainability and Vibrancy. In *Co-Published with Civil Service College Singapore and Institute of Policy Studies, National University of Singapore eBooks* (pp. 1–11).

⁹⁹ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229–258. <http://www.jstor.org/stable/41288828>; Teng, P., Lassa, J., & Caballero-Anthony, M. (2016). Climate Change and Fish Availability. *COSMOS*, 12(01), 29–42.; Do, H., & Ho, T. Q. (2022). Climate change adaptation strategies and shrimp aquaculture: Empirical evidence from the Mekong.

¹⁰⁰ Fumagalli, M. (2020). Luang Prabang: Climate change and rapid development. *Cities*, 97, 102549.

green initiatives and develop green tourism destinations.¹⁰¹ This proactive approach is likely to become more widespread as climate change escalates, underscoring the importance of safeguarding the sustainability of tourism destinations regionally.

As ASEAN nations grapple with the challenges of resource scarcity and rising greenhouse gas emissions driven by flourishing tourism, efforts to mitigate these impacts may involve substantial costs. Consequently, while policies aimed at limiting emissions and enhancing resilience are being pursued, there's recognition of the potential economic repercussions.¹⁰² For instance, the Reducing Emission Deforestation and Forest Degradation (REDD and REDD+) policies implemented to protect forests and reduce emissions in less developed nations have presented immense economic risks, including effects to food availability and palm oil production. While there is always cost and benefits of climate policies, those critical of the REDD and REDD+ policies are unsure if the benefits outweigh the costs, as regions like Indonesia are losing economic gains from timber, mine minerals, palm oil, and rubber, which generate significant income. Evidence shows that these regions will experience detrimental impacts on financial security that outweigh the benefits of reducing deforestation, likely because these resources produce jobs, increase capital, and work to create biofuel.¹⁰³ Moreover, as explained, new policies are implemented to stall dam building in the Mekong River for environmental reasons, despite it being pivotal in the energy sector.¹⁰⁴ Research shows that 85 percent of natural disasters result from hydro meteorological hazards and have contributed to 75 percent of global economic losses between 1980 and 2005, with most of these effects occurring in Asia.¹⁰⁵ Research analyzing climate impacts on Southeast Asia's energy sector and economy has largely been absent from the literature, despite needing attention.¹⁰⁶ Specifically, critical analyses of policies like this illustrate that introducing climate-related policies has crucial economic impacts that are worth investigating.

For instance, climate change is believed to have widespread economic impacts, particularly in less developed nations, like those of Southeast Asia, they "are likely to be [less] resilient and [less] able to adapt."¹⁰⁷ Thus, the literature indicates that adaptation and resilience plans, policies, and committees must be implemented, especially with climate change impacts increasing at an alarming rate. Recent research has called for more attention dedicated to adaptation and resilience building, with particular attention to climate financing.¹⁰⁸ Specifically, extremely vulnerable regions, including ASEAN states, face the most extensive economic ramifications, considering their dire need to invest in resilience, which aggravates sovereign risk in the region. Sovereign risk exacerbates governmental stability and

¹⁰¹ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229–258. <http://www.jstor.org/stable/41288828>

¹⁰² Seah, Sharon. "Climate Change: Southeast Asia's Existential Threat." *Southeast Asian Affairs*, vol. 2022, 2022, p. 73-88. Project MUSE muse.jhu.edu/article/855264; Caballero-Anthony, M. (2018). Health and human security challenges in Asia: new agendas for strengthening regional health governance. *Australian Journal of International Affairs*, 72(6), 602–616; Durrani, A. (2022, November 1). *Resetting Southeast Asia's climate agenda*. Project Syndicate. <https://www.project-syndicate.org/commentary/asean-mitigating-climate-risks-carbon-neutrality-by-aziz-durrani-2022-10>

¹⁰³ Ewing, J. Jackson, 2011, *Forests, Food and Fuel: REDD+ and Indonesia's Land-use Conundrum*, Asia Security Initiative Policy Series No. 19, Singapore: RSIS Centre for Non-Traditional Security (NTS) Studies.

¹⁰⁴ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229–258. <http://www.jstor.org/stable/41288828>

¹⁰⁵ Shadman, F., Sadeghipour, S. M., Moghavvemi, M., & Saidur, R. (2016). Drought and energy security in key ASEAN countries. *Renewable & Sustainable Energy Reviews*, 53, 50–58; Golnaraghi M. Hydro-meteorological hazard assessment: essential step toward enhanced disaster risk management. Paper presented at ProVention Consortium. Bangkok, Thailand; 2006.

¹⁰⁶ Shadman, F., Sadeghipour, S. M., Moghavvemi, M., & Saidur, R. (2016). Drought and energy security in key ASEAN countries. *Renewable & Sustainable Energy Reviews*, 53, 50–58.

¹⁰⁷ Elliott, L. (2017). Environmental regionalism: moving in from the policy margins. *The Pacific Review*, 30(6), 960.

¹⁰⁸ Caballero-Anthony, M. (2018). Health and human security challenges in Asia: new agendas for strengthening regional health governance. *Australian Journal of International Affairs*, 72(6), 602–616.

capacity to adapt to climate disasters, where they are already grappling with sovereign bond payments.¹⁰⁹ A study that assessed climate adaptation plans in less developed countries found that coordinating agencies, such as environmental and financing/planning ministries, proved to be the most significant in mainstreaming adaptation efforts.¹¹⁰

Furthermore, without strategies in place, Southeast Asia would and will likely experience detrimental effects on their economy. It was reported that from 1970 to 2009, there were a total of 1,211 disasters that resulted in 414,927 deaths. The economic turmoil following these disasters leads to local and national consequences. For example, Typhoon Haiyan in the Philippines claimed thousands of lives and facilitated hundreds of missing and injured persons. Additionally, nearly 4 million people were forced to migrate from their homes and the region endured about \$12.9 billion in damages.¹¹¹ Moreover, the 2011 floods in Thailand produced \$45 billion in damage, largely affecting homes, farms, and infrastructure.¹¹² It was reported that if there had been a disaster management plan in place in the Philippines, the economic ramifications would not have been so great.¹¹³ In fact, scholars suggest that there should be “a substantial amount of relief fund... readily available for immediate disposal and disbursement anywhere,” this way, ASEAN states would not be dependent on neighboring countries and allies when more inevitable disasters occur.¹¹⁴ Some states have already implemented insurance programs, including Vietnam, Indonesia, and Thailand, which provide aid for local farmers if their crops are affected by climate shocks.¹¹⁵ Southeast Asia also formulated the ASEAN Regional Knowledge Network on Forest and Climate change, The ASEAN Centre for Biodiversity, and the ASEAN Wildlife Enforcement Network, among others, with ASEAN aiming to enhance its autonomy and reduce dependence on external consultants and international advice.¹¹⁶

Overall, scholars and practitioners should not and cannot investigate economic frames exclusive from security frames. Rather, they overlap and interact with one another. In other words, impacts on the economy should be examined as a security threat. As the extracted literature suggests, climate security encompasses water, food, human, and economic security, among others. Thus, the review of economic frames is limited.

Science Frames

Key findings:

1. *Southeast Asia is considered one of the most vulnerable regions in the world to climate change impacts due to its geographical location and rise in greenhouse gas emissions.*
2. *Southeast Asia is witnessing dramatic increases in climate shocks, including floods and droughts, consequently affecting livelihood activities.*
3. *Food and water insecurity are becoming more prominent as issues like food and water-borne contamination and illness spread.*

¹⁰⁹ Beirne, J., Renzhi, N., & Volz, U. (2021). Bracing for the Typhoon: Climate change and sovereign risk in Southeast Asia. *Sustainable Development*, 29(3), 537–551.

¹¹⁰ Saito, N. (2012). Mainstreaming climate change adaptation in least developed countries in South and Southeast Asia. *Mitigation and Adaptation Strategies for Global Change*, 18(6), 825–849.

¹¹¹ *Philippines - Typhoon Yolanda Ongoing Recovery: Recovery Framework Case Study August 2014 - Philippines*. (2014, September 15). ReliefWeb. <https://reliefweb.int/report/philippines/philippines-typhoon-yolanda-ongoing-recovery-recovery-framework-case-study-august>

¹¹² Caballero-Anthony, M. (2018). Health and human security challenges in Asia: new agendas for strengthening regional health governance. *Australian Journal of International Affairs*, 72(6), 602–616.

¹¹³ Lucero-Prisno, D. E. (2014). Disasters, resilience, and the ASEAN integration. *Global Health Action*, 7(1).

¹¹⁴ *Ibid.*, p. 1.

¹¹⁵ Chen, C., & Trias, A. P. L. (2020). *Water Security in Southeast Asia: Regional, National, and Sub-national Challenges*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep26885>

¹¹⁶ Elliott, L. (2017). Environmental regionalism: moving in from the policy margins. *The Pacific Review*, 30(6), 958.

A major theme of literature deploying science framing is the degree to which climate science points to the extreme vulnerability of Southeast Asia to negative climate change impacts. Evidence suggests climate change impacts are increasingly becoming an issue, particularly in Southeast Asia. Data shows that global average temperatures have increased by 0.85 degrees Celsius over 100 years.¹¹⁷ Moreover, between 2000 and 2012, the world experienced disastrous natural disasters resulting in 2.74 billion deaths, with nearly 90 percent of the climate-related disasters occurring in Southeast, Southern, and Eastern Asia.¹¹⁸ Not to mention, the Asian Climate Security Vulnerability Model 1.0 (ACSV) points to Bangladesh, southern Myanmar, and southern and northwest Pakistan as regions the most vulnerable to climate impacts.¹¹⁹ Scientists are observing detrimental impacts from climate change, including increased global average sea surface temperatures and sea levels, an uptake of anthropogenic CO₂ emissions by the ocean, increased acidity and carbonate concentrations, and impacts to the “Coral Triangle,” among others in the Southeast Asian region, and these impacts are not likely to slow down.¹²⁰

The Inter-Governmental Panel on Climate Change (IPCC) has recognized Southeast Asia as an incredibly vulnerable region to climate change where it is predicted that these states will experience increases in frequency and intensity of cyclones, temperatures, rainfall, and flooding.¹²¹ The disproportionate impacts on Southeast Asian states manifest in multiple areas. First, Southeast Asia is dangerously situated and exposed to climate disasters like earthquakes and tsunamis preceding climate change. As climate-related risks escalate, they will compound existing risks. Specifically, “the Mekong region is widely acknowledged as among the most vulnerable regions of Southeast Asia due to flash floods and droughts.”¹²² The literature on climate change indicates that Southeast Asia’s climate vulnerability is exceptionally high. Busby et al. (2018)¹²³ find that low-elevation coastal areas in Bangladesh and Myanmar allow for increased exposure to climate impacts. This finding is further supported by other studies that find that Bangladesh is witnessing climate variability, such as changes in sea level and temperatures, as well as climate shocks like floods, droughts, and storms, dramatically impacting coastal communities.¹²⁴ Jakarta is witnessing noticeable increases in sea levels as a result of increased rainfall and floods, and scientists predict that by 2050, some parts of Jakarta will be submerged.¹²⁵ There is also evidence that negative rainfall anomalies contribute to extreme droughts in central and northern Sri Lanka, Thailand, Cambodia, and southern Vietnam. These impacts are affecting freshwater availability within these regions. Further, wildfires are concentrated in southern

¹¹⁷ IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp

¹¹⁸ Busby, J. W., Smith, T. G., Krishnan, N., Wight, C., & Vallejo-Gutierrez, S. (2018). In harm’s way: Climate security vulnerability in Asia. *World Development*, 112, 88–118.

¹¹⁹ Busby, J., Smith, T., Krishnan, N., & Wight, C. (2016). Climate Security Vulnerability in Asia 1.0. In *The Robert S. Strauss Center for International Security and Law*. https://strausscenter.org/wp-content/uploads/cepsa/CEPSA_Vulnerability_Brief-1.pdf

¹²⁰ IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp

¹²¹ Seah, S. (2022). Climate Change: Southeast Asia’s Existential Threat. *Southeast Asian Affairs* 2022, 73–88. <https://www.muse.jhu.edu/article/855264>; Caballero-Anthony, M. (2018). Health and human security challenges in Asia: new agendas for strengthening regional health governance. *Australian Journal of International Affairs*, 72(6), 602–616.

¹²² Fumagalli, M. (2020). Luang Prabang: Climate change and rapid development. *Cities*, 97, 102549.

¹²³ Busby, J. W., Smith, T. G., Krishnan, N., Wight, C., & Vallejo-Gutierrez, S. (2018). In harm’s way: Climate security vulnerability in Asia. *World Development*, 112, 88–118.

¹²⁴ Khan, A., Xun, W., Ahsan, H., & Vineis, P. (2011). Climate Change, Sea-Level Rise, & Health Impacts in Bangladesh. *Environment: Science and Policy for Sustainable Development*, 53(5), 18–33.

¹²⁵ Firman, T., Surbakti, I. M., Idroes, I. C., & Simarmata, H. A. (2011). Potential climate-change related vulnerabilities in Jakarta: Challenges and current status. *Habitat International*, 35(2), 372–378.

Myanmar, Thailand, northern Laos and Vietnam, and eastern Cambodia.¹²⁶ Second, Southeast Asia's share of greenhouse gases (GHG) emissions is likely to increase, with predictions of GHG emissions increasing by 34 percent to 147 percent between 2017 and 2040,¹²⁷ further exacerbating climate consequences. Historically, Southeast Asia is not a significant contributor to carbon dioxide emissions, though data shows an increasing trend in recent years, as a result of Indonesia's extensive industrialization of palm oil agriculture.¹²⁸ This evidence, coupled with additional vulnerability indexes, proves Southeast Asia's climate security vulnerability is elevated and will likely have significant effects on ASEAN communities.

Literature within the science frame also discusses the societal impacts of climate change-related risks connecting climate science to livelihood disruption. As a result of heightened climate crises and impacts, communities in the region are faced with environmental changes and livelihood disruptions. For instance, marine fisheries are heavily affected by climate change, where fishermen observe changes in oceanic temperatures, acidity, and rising sea levels.¹²⁹ Along with increased overall fish consumption, these stressors are introducing challenges to the supply chain and overall fish availability, and are increasingly compounded in states that experience droughts, like Indonesia.¹³⁰ These impacts are likely to devastate ASEAN states, specifically Indonesia, Vietnam, Malaysia, and Thailand, which encompass most of the fishing industry in Southeast Asia.¹³¹ Likewise, coastal communities find that climate shocks and variabilities, like cyclones, sea-level rise, changing temperatures and rainfall, floods, and droughts affect shrimp production. These climate-related impacts are poisoning water sources, further causing diseases in the fish. The effects are especially noticeable in Vietnam's Mekong Delta, which is witnessing notable impacts on agriculture and aquaculture production.¹³² Scholars note that it is essential for household farmers to implement adaptation strategies like dike-upgrading, pond-lining, and settling ponds to improve shrimp production.¹³³ If not, polluted water and food sources will further affect Southeast Asia's population's health and livelihoods.

The imperative for farmers to implement adaptation strategies to safeguard existing water sources underscores the critical link between environmental resilience and public health in Southeast Asia, where food and water insecurity are becoming more prominent due to issues such as food and water-borne contamination and illness spread. Previous work in climate change focused on scientific impacts on food and water availability, ignoring impacts on public health.¹³⁴ Along with direct impacts on water and food production and consumption due to climate change, Southeast Asia is observing noticeable increases in deadly, infectious diseases. These diseases related to climate change can be categorized into three distinct groups: 1) water-borne diseases, 2) food-borne diseases, and 3) vector-

¹²⁶ Ibid.

¹²⁷ Seah, S. (2022). Climate Change: Southeast Asia's Existential Threat. *Southeast Asian Affairs* 2022, 73-88. <https://www.muse.jhu.edu/article/855264>.

¹²⁸ Lee, Z. H., Sethupathi, S., Lee, K. T., & Bhatia, S. (2013). An overview on global warming in Southeast Asia: CO 2 emission status, efforts done, and barriers. *Renewable & Sustainable Energy Reviews*, 28, 71-81.

¹²⁹ Teng, P., Lassa, J., & Caballero-Anthony, M. (2016). Climate Change and Fish Availability. *COSMOS*, 12(01), 29-42.

¹³⁰ Marks, D. (2011). Climate Change and Thailand: Impact and Response. *Contemporary Southeast Asia*, 33(2), 229-258. <http://www.jstor.org/stable/41288828>

¹³¹ Caballero-Anthony, M. (2018). Health and human security challenges in Asia: new agendas for strengthening regional health governance. *Australian Journal of International Affairs*, 72(6), 602-616.

¹³² Tuấn, L. A., & Chinvanno, S. (2011). Climate change in the Mekong River Delta and key concerns on future climate threats. In *Advances in global change research* (pp. 207-217).

¹³³ Do, H., & Ho, T. Q. (2022). Climate change adaptation strategies and shrimp aquaculture: Empirical evidence from the Mekong.

¹³⁴ Palermo, V., & Hernández, Y. (2020). Group discussions on how to implement a participatory process in climate adaptation planning: a case study in Malaysia. *Ecological Economics*, 177, 106791.

borne diseases.¹³⁵ Asian countries are enduring diseases such as Legionnaires' disease, HIV/AIDS, hepatitis C, mad-cow disease, SARS, Middle East Respiratory Syndrome (MERS), Nipah and Ebola virus diseases, and COVID-19, which is then compounded by climate-induced diseases like dengue, Zika, and West Nile virus.¹³⁶ Additionally, as a result of a decline in water availability, Southeast Asia increasingly relies on wastewater as its primary source of water. This water practice not only impacts the food industry and water availability but also facilitates viral and bacterial diseases like salmonellosis, shigellosis, cholera, giardiasis, amoebiasis, hepatitis A, viral enteritis, and diarrheal diseases.¹³⁷ Experts point to drinking water contamination as the main source of water-borne illnesses.¹³⁸ Additionally, aquacultural and agricultural workers in frequent contact with wastewater are exposed to various contaminants, resulting in skin diseases.¹³⁹ Evidence suggests that environmental factors play an important role in the spread of infections and diseases.¹⁴⁰ Moreover, apart from impacts on food availability as discussed above, there are noticeable increases in food-borne diseases either through food contamination or water, soil, or air pollution, further diminishing the available food supply.¹⁴¹ Overall, Southeast Asia remains vulnerable to environmental disasters while simultaneously being dependent on food and water production that relies on weather conditions.¹⁴²

While scientific frames introduce objective climate-induced consequences, these frames are inextricably linked to security frames. Scientific impacts, including climate shocks and variability, drive novel national security threats. Thus, it is essential to integrate scientific frames within the context of national security to understand climate-related hazards fully and for practitioners to adopt best practices and strategies.¹⁴³

Counter-Frames

Key findings:

1. *Minority and vulnerable populations voices are often ignored in climate security discourse, despite their unique experiences and traditions that can contribute to resiliency.*

Literature categorized within counter-frames challenges the securitization of climate change by highlighting morality, ethics, and social progress as crucial perspectives for addressing, analyzing, and confronting this global issue. These frames consistently incorporate indigenous perspectives,

¹³⁵ Cissé, G. (2019). Food-borne and water-borne diseases under climate change in low- and middle-income countries: Further efforts needed for reducing environmental health exposure risks. *Acta Tropica*, 194, 181–188.

¹³⁶ Alam, N., Chu, C., Li, Q., Crook, A., Whittaker, M., Aditama, T. Y., Schak, E., Budiman, D., Barber, B. L., & Lu, J. (2020). The Pearl River Declaration: a timely call for enhancing health security through fostering a regional one health collaboration in the Asia-Pacific. *Globalization and Health*, 16(1); Miller, M. (2020, December 29). *Urban resilience in a time of COVID-19 and climate change in Southeast Asia*. LSE Southeast Asia Blog. <https://blogs.lse.ac.uk/seac/2020/12/29/urban-resilience-in-a-time-of-covid-19-and-climate-change-in-southeast-asia/>

¹³⁷ Dickinson, S., Schuster-Wallace, C. J., Qadir, M., & Pizzacalla, K. (2016). A review of health risks and pathways for exposure to wastewater use in agriculture. *Environmental Health Perspectives*, 124(7), 900–909; WHO (World Health Organization) Geneva: WHO; 2006. Guidelines for the Safe Use of Wastewater, Excreta and Greywater. Volume 2: Wastewater use in Agriculture.

¹³⁸ Cissé, G. (2019). Food-borne and water-borne diseases under climate change in low- and middle-income countries: Further efforts needed for reducing environmental health exposure risks. *Acta Tropica*, 194, 181–188.

¹³⁹ Dickinson, S., Schuster-Wallace, C. J., Qadir, M., & Pizzacalla, K. (2016). A review of health risks and pathways for exposure to wastewater use in agriculture. *Environmental Health Perspectives*, 124(7), 900–909.

¹⁴⁰ Cissé, G. (2019). Food-borne and water-borne diseases under climate change in low- and middle-income countries: Further efforts needed for reducing environmental health exposure risks. *Acta Tropica*, 194, 181–188.

¹⁴¹ Ibid.

¹⁴² Biggs, E., Boruff, B., Bruce, E., Duncan, J., Haworth, B., Duce, S., Horsley, J., Curnow, J., Neef, A., McNeill, K., Pauli, N., Fuentes, I., & Imanari, Y. (2014). *Environmental livelihood security in Southeast Asia and Oceania: a water-energy-food-livelihoods nexus approach for spatially assessing change*. White paper.

¹⁴³ Hiwasaki, L., Luna, E. M., Syamsidik, S., & Marçal, J. A. (2014). Local and indigenous knowledge on climate-related hazards of coastal and small island communities in Southeast Asia. *Climatic Change*, 128(1–2), 35–56.

emphasizing the interconnectedness of nature, culture, and community. In contrast to mainstream narratives that prioritize securitization, these perspectives advocate for culturally grounded and sustainable approaches. By centering indigenous viewpoints, counter-frames diversify the discourse on climate change, incorporating alternative perspectives and solutions. Moreover, this literature underscores the unique impact of climate change on marginalized groups, emphasizing the need for greater research attention to address the specific challenges they face. This aligns with the principles upheld within counter-frames, further emphasizing their support for inclusivity and alternative perspectives in addressing climate-related issues.

Research reveals a significant disparity between the climate-related needs of indigenous and marginalized communities and the perspectives of experts. Literature states that the management of disasters is often handled by elites and does not reflect the needs of affected communities.¹⁴⁴ Indigenous groups face the brunt of climate impacts, as they lack alternative livelihood options in adapting to climate change. Specifically, indigenous groups heavily rely on traditional livelihoods such as agricultural practices, which are highly sensitive to environmental changes. This reliance is compounded by their limited access to resources, infrastructure, and economic opportunities, which hinders their ability to adapt. The absence of alternative livelihood options further intensifies their vulnerability. Consequently, these communities, particularly women tasked with ensuring food security, are forced to migrate.¹⁴⁵ As a result of gender roles within these communities, women bear the burden of climate-related consequences as their livelihoods depend on planting and harvesting food for their family. When forced to migrate, indigenous communities observe noticeable vulnerabilities compounded, with women migrating to seek new means of acquiring resources. Indigenous women in Laos state that they “do not have information on safe migration and are forced to migrate without passports and work permits and are unsafe traveling alone; that women lack independence to travel for work; that disasters have destroyed their home; and that they lack income and jobs in the community,” resulting in noticeable increases in gender-based violence.¹⁴⁶ Moreover, when climate disasters impact these regions, women are not only responsible for themselves but children and the elderly that require aid and assistance. Thus, these regions are working to implement adaptation strategies tailored to women and indigenous populations.¹⁴⁷

In fact, scholars are deepening their understanding and knowledge of climate change’s impacts through the lens of marginalized communities. Marginalized communities often have direct interactions with their environments. It is believed that engaging indigenous peoples’ perspective, policymakers will be better suited to create climate adaptation plans. Despite investigators pointing to indigenous knowledge of climate change as a vehicle in the policy space, these populations have historically been marginalized from political discourse. Thus, research exploring the impacts of climate-related disasters and impacts observed by indigenous communities is calling for officials to pay attention to these groups, as they have “long histories of observing changes in the environment, have amassed a wealth of knowledge and practices that are closely related to these changes,” including their culture’s folklore, rituals, and ceremonies, customary laws, local food and resources, and direct observations of the environment.¹⁴⁸

Literature investigating how indigenous populations can contribute to and shape policy is demonstrated by analyzing Palawan Island in the Philippines. Scholars suggest that without local and

¹⁴⁴ Simpson, A., & Smits, M. (2016). Transitions to energy and climate security in Thailand. In *Routledge eBooks* (pp. 296–311)

¹⁴⁵¹⁴⁵ Pentlow, S. (2020, June 1). *Indigenous Perspectives on gender, power and climate-related displacement | Forced Migration Review*. Forced Migration Review. <https://www.fmreview.org/issue64/pentlow>

¹⁴⁶ Ibid.

¹⁴⁷ Ibid.

¹⁴⁸ Hiwasaki, L., Luna, E. M., Syamsidik, S., & Marçal, J. A. (2014). Local and indigenous knowledge on climate-related hazards of coastal and small island communities in Southeast Asia. *Climatic Change*, 128(1–2), 43.

indigenous knowledge of forest degradation, policies implemented can disrupt local livelihoods and dictate indigenous customary lands, forest use, and carbon storage. Thus, it is essential to consider indigenous voices when creating strategies, plans, and policies. Taking indigenous voices into account is known as a “bottom-up” policy approach that observes and pays attention to these marginalized and disadvantaged voices to guide their policy decisions, also known as transformative resilience.¹⁴⁹ Through discourse with indigenous people, practitioners will gain insight into how these populations negotiate and value carbon, as well as their existing forest-based livelihoods.¹⁵⁰ Overall, literature within counter-frames points to a bottom-up approach to climate resilience.¹⁵¹

Conclusions

Recently, there is a growing trend in literature of securitizing climate change. This paradigm shift signifies a departure from viewing climate-related initiatives solely through an environmental lens. Instead, contemporary discourse on climate resilience has evolved to encompass a broader security agenda, extending its implications beyond the environmental sector. The securitization of climate change narratives involves recognizing that efforts to combat and manage climate-related impacts have far-reaching consequences across various dimensions of security. This expanded perspective includes not only environmental security but also extends to economic, food, water, disease, and human security. By framing climate change within the context of security, scholars and policymakers acknowledge the intricate interplay between climate-related challenges and their multifaceted impacts on diverse aspects of societal well-being. Consequently, securitizing climate change serves as a strategic approach to comprehensively address the complex and interrelated challenges posed by a changing climate, fostering a more holistic and integrated response within the realm of security studies.¹⁵²

Numerous adaptation and resilience plans have been introduced and implemented in ASEAN states, and each state applies mitigation attempts differently. Cambodia introduced the National Environmental Action Plan (1998), and Indonesia has the 2002 ASEAN Agreement on Transboundary Haze Pollution. Laos focused on deforestation plans, while Malaysia has several plans, including the Ninth Malaysia Plan 2006-2010, the National Physical Plan, the Programme to Plant Mangroves and Other Species along the Coastal Areas in Malaysia, and formed the Malaysian Climate Change Group (MCCG), the Philippines incorporated the Philippines Strategy for Sustainable Development, the Philippine Agenda 21, the Department of Environment and Natural Resources agro-forestry programme, and formed the Philippine Network on Climate Change, Singapore has the National Climate Change Strategy, Thailand established the National Climate Change Committee and the Policy and Perspective Plan for Enhancement and Conservation of National Environmental Quality, and Vietnam organized the National Target Programme on Climate Change and Sea-level rise, among many others.¹⁵³ Despite these efforts, literature on climate security suggests that plans to date remain insufficient or do not address the correct needs.

¹⁴⁹ Elliott, L. (2012). *Climate Change and Migration in Southeast Asia: Responding to a New Human Security Challenge*. S. Rajaratnam School of International Studies. <http://www.jstor.org/stable/resrep17163>; McMillan, R., Kocsis, J., & Danière, A. (2021). Rights, justice and climate resilience: lessons from fieldwork in urban Southeast Asia. *Environment and Urbanization*, 34(1), 170–189.

¹⁵⁰ Dressler, W., McDermott, M., Smith, W., & Pulhin, J. M. (2012). REDD policy impacts on indigenous property rights regimes on Palawan Island, the Philippines. *Human Ecology*, 40(5), 679–691.

¹⁵¹ McMillan, R., Kocsis, J., & Danière, A. (2021). Rights, justice and climate resilience: lessons from fieldwork in urban Southeast Asia. *Environment and Urbanization*, 34(1), 170–189; Morrissey, J. (2020). Mobilising the language of emergency: human security and climate action discourse. *Irish Studies in International Affairs*, 31, 59.

¹⁵² Henkin, Samuel D. and Madeline Romm. 2023. "Re-Thinking Climate Security." College Park, MD: START (April)

¹⁵³ Caballero-Anthony, M. (2010). Climate change and human security in Southeast Asia: issues and challenges. In *Palgrave Macmillan UK eBooks* (pp. 393–413).

The extensive body of literature presented underscores the urgent and multifaceted challenges that Southeast Asia faces in the wake of climate change. The region is not only experiencing observable shifts in climatic patterns, rising temperatures, and an increase in the frequency and intensity of natural disasters, but it is also grappling with the far-reaching consequences on various societal aspects. The vulnerability of Southeast Asia to climate change is evident in the disproportionate impact on coastal regions, low-lying areas, and communities dependent on agriculture and fisheries. The heightened vulnerability is further exacerbated by the region's contribution to greenhouse gas emissions, which are predicted to rise significantly in the coming decades. The intricate interplay between environmental factors and livelihoods is resulting in disruptions to food and water availability, posing a significant threat to public health and overall well-being of the ASEAN communities.

Moreover, as the ASEAN region positions itself to become a major global economic player, the impacts of climate change pose a significant threat to the envisioned growth trajectory. The evident consequences of rising global temperatures, including heat stress affecting worker productivity and disruptions to agriculture and aquaculture, highlight the vulnerability of the region's economy. Additionally, the interconnectedness of climate change and the tourism industry, a major contributor to the region's economy, suggests that the environmental and economic impacts are interwoven. The projected growth in tourist arrivals, while contributing to economic expansion, also raises concerns about its concurrent role in exacerbating climate change. Evidence of maladaptation is also apparent in climate-related policies and strategies aimed at reducing greenhouse gas emissions, presenting a delicate balance between environmental protection and economic sustainability. The economic risks associated with policies like REDD and REDD+ greatly affect the complexity of decision-making, where trade-offs between economic gains and environmental preservation must be carefully navigated. Similarly, the impact of policies limiting dam construction on the energy sector exemplifies the need for a nuanced approach that considers both economic and environmental implications. The importance of building adaptive capacity and resilience, particularly in less developed nations like those in ASEAN, cannot be overstated. The call for attention to climate financing, the establishment of coordinating agencies, and the need for readily available relief funds emphasize the necessity for proactive measures to mitigate the economic fallout of climate-related events.

ASEAN is experiencing climate change at the highest level, which requires work from all sectors. More research on climate security within this region needs to be applied to sustainable development. Evidence suggests that there is a disconnect between academic analysis in climate security and how it is applied in the policy space.¹⁵⁴ This misunderstanding between sectors has halted climate discourse and its influence in policy making and among practitioners. Thus, conversations among scholars and scientists tend to remain stagnant within this space, resulting in a deficit in resiliency planning. Therefore, while the government is participating in conversations regarding climate change and implementing adaptation plans to a degree,¹⁵⁵ climate security needs to be the top priority that encompasses scientific, security, and economic frames. Overall, the intersection of scientific and economic findings with national security considerations emphasizes the need for a comprehensive approach to address climate-related hazards. As climate-induced consequences continue to unfold, it is imperative for policymakers, practitioners, and communities to collaborate on implementing adaptive strategies, sustainable practices, and effective policies that not only mitigate the impacts but also enhance the resilience of Southeast Asia in the face of this complex and evolving challenge. A comprehensive understanding of these dynamics is crucial for formulating effective policies and

¹⁵⁴ McMillan, R., Kocsis, J., & Danière, A. (2021). Rights, justice and climate resilience: lessons from fieldwork in urban Southeast Asia. *Environment and Urbanization*, 34(1), 170–189.

¹⁵⁵ ASEAN is rising to the climate change challenge facing agriculture and forestry. (2018). World Agroforestry Centre Southeast Asia Regional Program. <https://www.3blmedia.com/news/asean-rising-climate-change-challenge-facing-agriculture-and-forestry>

strategies that not only foster economic growth but also ensure the resilience and security of Southeast Asia in the face of escalating climate challenges. The stakes are high, and concerted efforts are required to safeguard the region's environment, economies, and, most importantly, the lives and livelihoods of its people.



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