CLIMATE CHANGE

AND ITS IMPACT ON PEACE AND SECURITY IN SOUTHEAST ASIA

CENTRE FOR NON-TRADITIONAL SECURITY STUDIES
S RAJARATNAM SCHOOL OF INTERNATIONAL STUDIES
NANYANG TECHNOLOGICAL UNIVERSITY, SINGAPORE

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Climate Change and Its Impact on Peace and Security in Southeast Asia

Executive Summary

Climate change is today one of the greatest risks to peace and security, but arguably remains at the margins of policy action amid the loss of trust in multilateral institutions. The impacts of climate change are already felt by local communities in regions on the frontline.[1] While communities have exercised agency to generate local impact and promote trust, the overwhelming impact of climate change necessitates effective state responses, and regional and global cooperation.[2] Global cooperation, in turn, needs to better address the challenges to peace and security faced by regions most exposed to the impacts of climate change.

Southeast Asia is already experiencing direct climate change impacts from changes in temperature, precipitation, sea-level rise, ocean warming, and more frequent and intense extreme weather events. The subsequent indirect climate change impacts on food and water security, and changes in natural resource exploitation and migration patterns, affect the lives and livelihoods of people and communities across the highly diverse region and threaten its peace and security.

In Southeast Asia, the cross-cutting impacts of climate change on peace and security can be analysed through the framework of comprehensive security. Comprehensive security is the organising concept of security in the region, integrated and widely reflected in the security lexicon in the ASEAN region and beyond. Unlike the conventional notion of security, which is narrowly defined to mean defending state borders from military attack, comprehensive security is a much broader conceptualisation of security that "[goes] beyond (but does not exclude) the military threats to embrace the political, economic and socio-cultural dimensions".[3]

Comprehensive security not only provides a broader understanding of security but is also an inclusive concept that brings in multiple referents of security beyond the state.[4] This concept also accounts for disaggregated impacts of security threats on marginalised and disadvantaged social groups, such as people with

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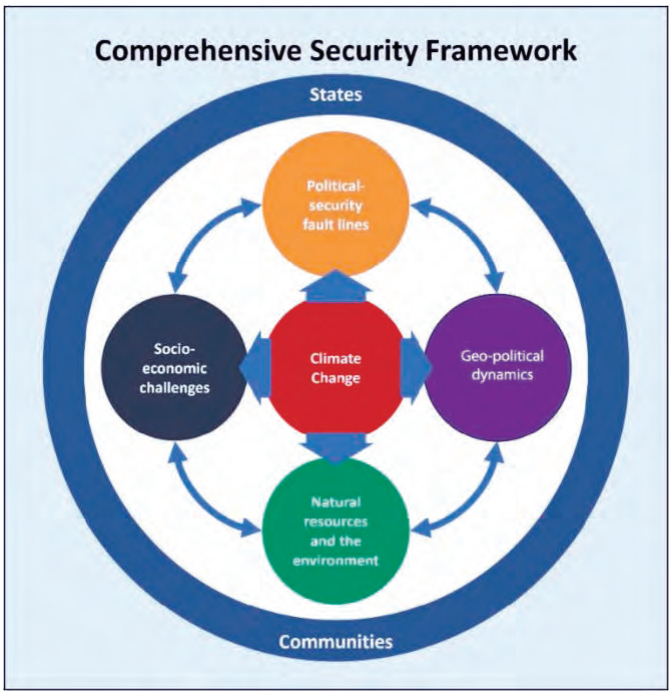
[1] Quan-Hoang Vuong, "Western Monopoly of Climate Science Is Creating an Eco-deficit Culture," *Economy, Land and Climate Insight* 11 (2021).
[2] David Lipton, "Trust and the Future of Multilateralism," *IMF Blog,* 10 May 2018, https://www.imf.org/en/Blogs/Articles/2018/05/10/blog-trust-and-the-future-of-multilateralism
[3] Muthiah Alagappa, "Comprehensive Security: Interpretations in ASEAN Countries," in *Asian Security Issues: Regional and Global,* ed. Robert A. Scalapino et al. (Berkeley, CA: Institute of East Asian Studies, University of California, 1988).
[4] Alagappa, "Comprehensive Security."

disabilities, women, ethnic minorities, migrants and rural populations that face disproportionate impacts on their human security and well-being. Thus, in the context of a changing climate, comprehensive security allows for a better understanding of the linkages between climate change, peace and security in the region, reflecting the multi-layered and polycentric governance processes in Southeast Asia that facilitate or limit the effective coordination of actors, information and resources.



The main objective of this report is to provide a broad scan of the cross-cutting impacts of climate change and their implications for peace and security in Southeast Asia. The analysis is guided by three major questions:

- *What* are the consequences of climate change on current problems and challenges to peace and security in Southeast Asia?
- *Who* are the most vulnerable, that is, which are the groups with less adaptive capacity in the face of climate-related security risks?
- *How* can the Association of Southeast Asian Nations (ASEAN) strengthen existing climate change frameworks and enhance regional cooperation to address and manage the multiple climate-related challenges to peace and security in Southeast Asia?

The region is home to populations of diverse religions, ethnicities, cultural groups and political systems. Economic interests and economic development are a common thread that promotes stability and security within and between states across the region. Against this backdrop, ASEAN member states collectively recognise the potential impact of climate change on the basic needs for human life, particularly for

already vulnerable groups that would be disproportionately affected by the impacts.[5] In other words, the notion of climate security for the region goes beyond the concern about the potential for violent conflicts to also include economic, political and socio-cultural dimensions.

Against the current global discourse on climate, peace and security, some Southeast Asian countries have argued that the security dimension of climate change should not be seen exclusively in terms of armed conflict. The relationship between climate and conflict is not linear. It is complex, nuanced and context-specific.[6] As such, conflict should be seen as a spectrum, ranging from societal differences and tensions, to state–society differences and political instability, and armed violence at the extreme end. That said, climate change and conflict, separately and together, undermine livelihoods, hinder adaptation and weaken social cohesion. It is therefore important to appreciate how climate, peace and security is framed and understood in Southeast Asia and the interconnections between the effects of climate change and current and extant security challenges in the region.

The severe human security challenges brought on by climate change are more than enough for the countries of Southeast Asia to consider climate change as a real and existential threat.[7] Equally important is the need to recognise the transnational consequences of sea-level rise, competition over water and marine resources, and forced displacement of already vulnerable groups. Managing these intersectionality and cross-border implications compels states and societies to work together while strengthening and deepening regional cooperation.

Across Southeast Asia, countries have committed to a "people-centred" approach that leaves no one behind in addressing contemporary security challenges. This includes climate change, as outlined in the ASEAN Community Vision 2025. ASEAN member states have further committed to the gender-responsive implementation of this vision and the United Nations Sustainable Development Goals.[8] These commitments reflect ASEAN's comprehensive approach to security in the region.

Therefore, the comprehensive security- framework allows for an inclusive approach that acknowledges the multiple actors and layers of governance needed to address

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[5] Association of Southeast Asian Nations (ASEAN), "ASEAN Joint Statement on Climate Change to the 27th Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP-27)," 22 November 2022, https://asean.org/wp-content/uploads/2022/11/33-ASEAN-Joint-Statement-on-Climate-Change-to-UNFCCC-COP-27.pdf

[6] Ariel R. Penaranda, "Threats to International Peace and Security: 'Sea-Level Rise – Implications for International Peace and Security'" (speech to the United Nations Security Council, New York, 14 February 2023), https://www.un.int/philippines/statements_speeches/threats-international-peace-and-security-"sea-level-rise-implications

[7] Chee Hean Teo, "Global Action for a More Sustainable World" (speech at the *Ministerial Conference on Sustaining Peace amidst the Climate Crisis*, 2 May 2022), https://www.pmo.gov.sg/Newsroom/SM-Teo-Chee-Hean-at-the-Ministerial-Conference-on-Sustaining-Peace-Amidst-the-Climate-Crisis

[8] ASEAN, "ASEAN Community Vision 2025," November 2015, https://www.asean.org/wp-content/uploads/images/2015/November/aec-page/ASEAN-Community-Vision-2025.pdf

"the complex and urgent challenges of poverty, growing inequality, climate change, conflict and fragility" outlined in the 2030 Agenda for Sustainable Development.

With global temperatures likely to cross the 1.5ºC of warming within the next five years, risk multipliers in the form of rising sea levels, extreme weather events, warming temperatures, changing rainfall patterns, loss of biodiversity and ecosystems, health impacts, threats to food and water security, economic impacts, migration and displacement, infrastructure vulnerability, and political and security challenges[9] are likely to be exacerbated. This warming is also likely to contribute to and further complicates the risk landscape ("riskscape") in Southeast Asia, already one of the most disaster-prone regions in the world.[10]

This report investigates the impacts of climate change on key socio-economic challenges, political-security fault lines, and geo-political dynamics in Southeast Asia. The section on socio-economic challenges identifies economy, food, health, water, natural resources, disasters, gender and forced migration as key loci for the impacts of climate change on peace and security in the region. The section on political-security fault lines discusses the converging impacts of climate change and internal armed conflicts, and how they could critically undermine the human security of internally displaced persons (IDPs) and vulnerable communities. The section on geo-political dynamics in Southeast Asia and the wider region examines how climate change further complicates tensions emanating from inter-state security challenges in the Mekong sub-region, and illegal, unreported and unregulated (IUU) fishing in the South China Sea.

Key Findings on Climate Change, Peace and Security Risks

Climate change can exacerbate the intensity and frequency of multifaceted peace and security issues in Southeast Asia. While it is not proven that climate change-induced events will directly lead to conflict and violence, climate change and conflict, separately and together, impact livelihoods, imperil adaptation, and weaken social cohesion. The compounding impact of climate change – interacting with various intractable peace and security challenges in the region – on vulnerable sectors and peoples could generate new security challenges to the well-being of states and communities. This report highlights the following key findings:

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[9] Intergovernmental Panel on Climate Change (IPCC), "Fact Sheet – Asia: Climate Change Impacts and Risks," October 2022, https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Asia.pdf.
[10] World Meteorological Organization (WMO), "The Global Climate in 2015–2019" (Geneva: WMO, 2019), https://library.wmo.int/doc_num.php?explnum_id=9936; Gloria Dickie, "'More Likely than Not' World Will Soon See 1.5 Degrees Celsius of Warming, World Meteorological Organization Says," *Reuters*, 18 May 2023, https://www.reuters.com/business/environment/more-likely-than-not-world-will-soon-see-15c-warming-wmo-2023-05-17/

i. Economic security

ASEAN is a multifaceted region composed of both lower- and higher-income member states. Some member states may be disproportionately vulnerable to climate change impacts on internationally important trade and transport sectors, especially in the case of lower-income countries which have limited financing to adapt their infrastructure to the changing climate. The failure to address persistent poverty and unequal development in the region, and to address the diverse needs of displaced populations, can place undue strains on regional peace and stability.

The impacts of climate change on economic security are broad and likely to vary depending on the locations and types of industries. Changes in temperature and precipitation can have negative impacts on GDP growth, including through impacts on labour and productivity in the agriculture, manufacturing and services sectors, and human capital. Such diverse impacts within the region encompass sectors such as water management, agriculture and food security, tourism, health, natural resource management, human settlement and security, amounting to as much as USD 18–19 billion heading up to 2050. However, there are glaring gaps in generating harmonised and comparable downscaled data on the impacts of climate change across economic sectors. In particular, one gap is that available data reflect country-specific impacts of specific climate threats, with insufficient disaggregation accounting for impacts by economic sector. A second gap is that sector-specific analysis is likewise limited to the global and regional level, with limited disaggregation or "downscaling" at the national and sub-national levels.

ii. Food security

Southeast Asia is considered the world's "rice bowl" given that more than 80% of the global rice trade is sourced from the region. Yet, owing to climate change, the yields or productivity of agriculture are expected to decline by 10% by 2050. Climate-induced disasters could further punctuate food insecurity challenges from climate-induced impacts on food production, food prices, and disruptions to food trade and distribution. Due to the impact of climate change on productivity, Southeast Asia has already seen a "U-turn" in undernourishment levels, whereby undernourishment across the 10 ASEAN member states started increasing in 2014–2016, reversing from falling trends in undernourishment from 2000–2014. At the broader level, climate change can also have further distributional concerns for multiple actors across the supply chain, from food production (including crops, livestock, fisheries and aquaculture), to transport, storage and food consumption, owing to climate factors such as temperatures, humidity, precipitation and extreme weather events.

iii. Health security

When faced with the effects of climate change, the vulnerabilities of healthcare systems in Southeast Asia could be compounded. In developing countries grappling with weak health systems, lack of medical personnel and issues surrounding cost of and access to medical care and healthcare, climate change effects, such as rising global temperatures, vector-borne diseases and zoonotic transmissions, would have a detrimental impact on their health security (see section 3.3). Some countries in Southeast Asia also have disparities in access to quality health services, when access to quality health services would be extremely needed by climate change-affected sectors. Vulnerable groups such as conflict-prone communities, women, ethnic minorities, the elderly and migrant workers may face inadequate access to social and health services and social security infrastructure even as they bear the brunt of the impact of climate change.

iv. Water security

Hydropower dam projects in the Mekong River have generated concerns and potential tensions between upstream and downstream states. Several studies have highlighted the adverse effects of dam projects, particularly in downstream countries, such as fish stock depletion, negative changes in river hydrology, and sediment flux (see section 3.4). The case of the Mekong River highlights contending interests from water security, energy security and food security stakeholders. The unintended impact of hydropower dams, exacerbated by climate change, on the health of the Mekong River has severely affected the economic security of farmers and fisherfolk that have traditionally relied on the river. Furthermore, dam projects have also led to forced displacement of ethnic minorities.

The growing intensity and variability of climate change-induced weather events should be a concern for Southeast Asia because it further exposes populations at-risk, even those not previously affected, to water security issues. Recent studies warn that up to 96% of the ASEAN region is likely to be affected by drought, and up to 64% will face extreme drought. This will bring about complex challenges with regard to access to clean water for agriculture and domestic consumption. Nonetheless, there is no evidence yet that water insecurity issues in the region are generating societal and transboundary armed conflicts over dwindling freshwater resources.

v. Natural resources

Southeast Asia is projected to become a vital node in the global supply chain supporting the green energy transition. Southeast Asia has some of the critical mineral deposits in Southeast Asia necessary in making the components for solar panels, batteries for electric vehicles, and wind turbines. This has significant ramifications for the region, both in terms of its sustainable development trajectory and related

challenges to peace and security. Increased mining would have local impacts, including on communities (see section 3.5). With the procurement of critical minerals now a key obstacle to achieving decarbonisation and international security, increased geo-political competition for the resources could also be expected. These developments have become a critical element of how countries in Southeast Asia experience climate impacts on regional peace and security.

vi. Disasters

Concurrent and sequential disasters are stretching the national capacity to respond effectively, and underinvestment in sustainable development and infrastructure adaptation remains a key challenge to regional peace and security (see section 3.6). Sea-level rise will have a more sustained and gradual impact but is no less critical as it would affect more people. Both climate impacts – disasters and sea-level rise – require sustained commitment to protect human security over the longer term. To this end, the ASEAN Agreement on Disaster Management and Emergency Response has highlighted the importance of regional cooperation as a starting point toward a more resilient region. Also key would be to recognise that the impact of extreme weather events would be more severe for vulnerable groups and communities.

vii. Gender

Policies to improve gender equality and increase women's capacity and resilience to climate change are present at the formal levels, enshrined in legislation or through the ratification of relevant documents. However, their impact has been limited by patriarchal norms and traditional gender roles (for example, women taking on a higher share of care responsibilities and having lower access to information). There is therefore a need to ensure the inclusion of women in decision-making processes through representation and leadership, which would further ensure that climate policies are gender-responsive from the ground level up. By taking into consideration the specific needs of women (such as flexible schedules and childcare) and working with them to develop inclusive programmes that are tailored to build their climate resilience, policies that promote women's participation in climate initiatives and environmental peacebuilding can effectively work to empower them (see section 3.7).

viii. Forced migration

Climate change could trigger forced migration, directly, through extreme weather events, or indirectly, in the form of deteriorating living conditions and livelihoods as sea levels rise. Those forced to move as their homes become uninhabitable or their livelihoods unsustainable would be vulnerable to risks such as human trafficking, with women and girls in post-disaster situations in particular being at risk (see section 3.8). Nevertheless, it is important to recognise that the link between the climate change and

mobility is complex: climate change should not be seen as the only factor, but as one thread within the broader political, social and economic canvas.

ix. Internal conflicts

Climate change exacerbates pre-existing tensions, both directly, in extreme weather overlaying internal conflicts, and indirectly, with the increasing interest in exploiting resources, primarily hydropower. Extreme weather events have imposed additional burdens on conflict-prone communities whose adaptive capacity have long been compromised. Thousands have been temporarily displaced due to extreme weather events particularly in areas with pre-existing tensions in Southeast Asia. Nonetheless, internal conflicts and climate change appear to have no direct relationship. Existing internal conflicts in the region are not caused by climate change. However, the converging impacts of climate change and internal armed conflicts can critically undermine the human security of IDPs and vulnerable communities. These impacts may manifest as threats to their food security, economic security, health security, sustainable development, environmental rights and human rights. There are also conflicts over or local opposition to the construction of massive hydropower dams, particularly in traditional lands and river plains where ethnic minorities dwell. These cases could generate or aggravate ongoing internal conflicts. The compounding impacts of multiple climate-induced weather events and internal conflicts could jeopardise the capacity of relevant government agencies to respond.

x. Geo-political dynamics in the Mekong Sub-region

Analysts and experts have begun to describe the Mekong River as a potential geo-political security flashpoint, deeming this an area that could spark regional tensions and derail inter-state relations. There have been diverging interests in building hydropower dams and transboundary water management between upstream and downstream countries. However, the tensions and differences have not resulted in armed conflicts over the Mekong River. It is important to analyse how existing frameworks such as the Mekong River Commission can help foster cooperation in addressing climate change impacts in the Mekong Sub-region, including potential peace and security linkages.

xi. Geo-political dynamics in the South China Sea

Rising ocean temperatures means warmer waters in the South China Sea, driving fish to abandon their historic territories and migrate to temperate and cooler waters. Depleting fish stocks, worsening IUU fishing, and a degrading marine environment can add another layer to the traditional security threats in the South China Sea, in that depletion of marine resources like fish stocks worsens maritime disputes between

claimant states and strains inter-state relations. The warming waters and depleting fish stocks in the South China Sea might also exacerbate IUU fishing.

Pathways for Enhanced Cooperation on Climate Change, Peace and Security: Recommendations

With climate change now an indisputable key component of the peace and security calculus in Southeast Asia, it is necessary to integrate its impacts and effects into future planning to create opportunities for intervention by all stakeholders.

Outlined below is a proposed set of recommendations to foster a region-wide understanding of the climate, peace and security nexus and create collaborative opportunities. These are policy entry points for ASEAN across its socio-cultural, economic and political-security pillars, as well as national governments, civil society, and relevant international institutions, to promote deeper cooperation in addressing emerging challenges to peace and security brought about, directly and indirectly, by climate change.

i. Adopt policy frameworks and strategies that simultaneously address climate change and pursue conflict prevention and resolution.

Countries facing protracted internal conflicts can consider national action plans and strategies that aim to increase climate resilience among conflict-prone communities and vulnerable groups. State agencies, in collaboration with humanitarian and development organisations, should integrate climate change and peacebuilding objectives into local climate action and resilience-building in a conflict-affected context. Acknowledging the complex interplay between climate change stressors and inherent insecurity at the community level is a crucial step toward adopting comprehensive strategies for promoting social stability and cohesion, rule of law and climate resilience in conflict-afflicted communities. Integrated strategies address climate change adaptation and underlying drivers of conflicts as well as offer a pathway to effectively mitigate overlapping climate and conflict vulnerabilities. Policies should institutionalise inclusive and conflict-sensitive decision-making mechanisms to broaden the involvement of vulnerable groups, especially poor farmers and fisherfolk, indigenous peoples, IDPs, women and youth.

ii. Develop downscaled assessments of climate impacts on economic sectors to help prioritise a long-term climate change adaptation agenda and to strengthen ASEAN economic and trade-related infrastructure

ASEAN member states may be disproportionately vulnerable to climate change impacts in internationally important trade and transport sectors, especially in the case of lower-income countries. It is therefore critically important to have unhampered

supply flows of goods and services, as this could have an impact on labour and human capital development, incomes as well as consumption. However, there are gaps in data on downscaled climate change impacts across economic sectors. A much-needed future area of research in Southeast Asia will be to address this challenge at the country level and across sectors within countries. This can serve as a starting point for prioritising key economic areas which are vulnerable to climate-induced economic displacement. This analysis can build on existing initiatives of the ASEAN Working Group on Climate Change (AWGCC) alongside the studies by the Intergovernmental Panel on Climate Change (IPCC), potentially feeding into future editions of the *ASEAN State of Climate Change Report*. These can in turn feed into the development of common standards for climate adaptation of strategic ports, supply chain hubs, and trade infrastructure in vulnerable countries. This can be further complemented with international/multilateral investments to implement such standards for climate adaptation to avoid climate-induced supply chain disruptions.

iii. Hasten the implementation of guidelines for digitalisation in food supply chains

Digital technologies offer potential solutions to climate change impacts on agriculture, including early warning systems as well as tailored farmer advisory services for adapting planting schedules and practices to the changing climate. While the ASEAN Guidelines on Promoting the Utilization of Digital Technologies for ASEAN Food and Agricultural Sector has been developed and endorsed at the 43rd Meeting of the ASEAN Ministers on Agriculture and Forestry in 2021, further collaboration is required in hastening the implementation of the guidelines. As food security is a critical component of regional peace and security, agriculture presents a potential low-hanging fruit or a strategic area where the biggest impacts can be achieved from using digital technologies for climate change adaptation. As a starting point, regular meetings can be done to take stock of progress in the implementation of the said guidelines.

iv. Harness the role and mandate of ASEAN institutions on peace and security

ASEAN has established important institutions that can help the region reimagine a regional approach to conflict prevention and peacebuilding. They include the ASEAN Institute for Peace and Reconciliation (AIPR), ASEAN Commission on the Promotion and Protection of the Rights of Women and Children, ASEAN Intergovernmental Commission on Human Rights (AICHR) and the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre), among others. These regional mechanisms and institutions can significantly help facilitate, drive and lead multilateral initiatives aimed at addressing intractable conflicts and societal tensions in the region. ASEAN leaders can consider boosting the mandate and

capacity of these institutions to mainstream climate change, peace and security assessments to identify potential security risks emanating from climate-induced crises and challenges.

v. Mainstream participation, mediation and arbitration in resource management and conflict prevention

Mediation and arbitration have been important, efficient and cost-effective means of resolving disputes in Southeast Asia, in different settings and socio-economic contexts. Community-based mediation and arbitration mechanisms help prevent and mitigate societal tensions and conflicts. Managing the competing interests and needs of various communities and groups, in the context of peacebuilding, climate change impacts and the consequences of climate change adaptation and mitigation efforts, can be effectively done with strong partnerships with and the participation of grassroots leaders, local officials and community leaders. For instance, in the context of the management of marine resources and transboundary water affected by climate change, it is critical that resource sharing and co-management must be driven by the stakeholders themselves (farmers, fisherfolk, coastal communities, indigenous peoples, etc.) who can commit personal investment, ownership and buy-in to the process, resulting in more effective governance. An important requirement is for stakeholders in the region to demonstrate strong commitment to work together while respecting sovereignty and ethnocultural differences. Stakeholder participation can also lead to institutionalising better management systems and fair sharing of resources.

vi. Establish a regional platform for scientific collaboration in Southeast Asia

A regional platform for climate scientists, marine scientists, agricultural scientists, social scientists, and resource management experts can help ASEAN find and adopt science- and evidence-based regional frameworks and action plans and establish coordinated early warning systems and preparedness mechanisms. They can jointly explore or conduct knowledge sharing on smart water-resource and ocean resource management systems, and innovative practices and technologies, and develop new crop varieties that are more resilient to drought, salinity and flooding. Interdisciplinary scientific and social research facilitates more effective climate action and mitigation of potential drivers of conflicts in the region.

vii. Leverage regional mechanisms to strengthen climate change adaptation

Putting the AHA Centre, working in collaboration with the ASEAN Centre for Biodiversity and the ASEAN Specialised Meteorological Centre, at the forefront of ASEAN's climate change adaptation would be strategic. The expansion of its disaster

response mandate to engage intersecting risks (e.g., conflicts, pandemics, impacts of climate change, etc.) should be considered. This would also enhance ASEAN's commitment to addressing the climate emergency, through recognising the multidimensional nature of climate change and the interconnectedness of its collateral and subsequent disasters.

viii. Strengthen the capacity of sub-national entities and empower community leadership for disaster risk reduction in Southeast Asia

Over the past two decades, ASEAN member states have invested in and developed a disaster governance framework. It is now time to implement this vision outside of capital cities and central governments to meet the needs of populations exposed to rising sea levels and intensifying disasters. Through inter-sectoral partnerships developed at the regional level, ASEAN entities are well-positioned to share insights and expertise to strengthen capacity at the sub-national levels in line with regional and global commitments to achieve a resilient ASEAN region.

ix. Identify and build cross-sectoral synergies on critical minerals through regional cooperation to enhance climate change resilience in ASEAN

Interest in Southeast Asia's critical minerals has grown as the world ramps up efforts toward the green energy transition. There is therefore a need for ASEAN to identify a common definition of critical minerals to promote responsible resource management. This regional effort can then draw on the diversity of its membership to provide a comprehensive approach to its role as a key critical mineral source and production hub that is part of the global supply chain for the green energy transition. This will require greater strategic vision and stronger governance mechanisms on critical minerals that ensure no one is left behind or negatively impacted by the global green energy transition. This targeted effort will constitute a preventive measure to offset the potential for societal disruption and inter-state tensions within the region.

x. Strengthen gender-mainstreaming at all levels of policy development through the women, peace and security framework

ASEAN has already acknowledged the specific gendered nature of the impacts of crises on women through the ASEAN Joint Statement on the Women, Peace and Security (WPS) Agenda as well as the importance of the role of women in regional peace and security through the ASEAN Ministerial Dialogue on Strengthening Women's Role for Sustainable Peace and Security in 2020. This recognition should be furthered by integrating the WPS agenda across the whole of ASEAN as per its three community pillars: Political-Security Community, Economic Community and

Socio-Cultural Community.[11] With the WPS Regional Plan of Action, there is an opportunity to expand and use this framework to integrate a gender perspective when examining the linkages between climate, peace and security in the region. This will further enable policymakers to gain a holistic understanding of the socio-economic and political-security challenges facing the region, including the distribution of opportunities and resources, in the face of a rapidly intensifying climate riskscape.

xi. Institutionalise a comprehensive protection framework for displaced populations

Building on proposals from international humanitarian institutions, ASEAN can adopt and institutionalise a regional humanitarian and protection framework covering vulnerable peoples forcibly displaced by climate change-induced disasters, conflicts, and other humanitarian crises. Within such a protection framework, ASEAN can establish a system in the region to monitor emerging tensions, fragilities and protection needs, contributing to the identification of sustainable solutions. A regional protection agenda for displaced people that respects the principle of non-refoulement, protects human rights and serves the shared interests of countries in the region could be one collective response of ASEAN to emerging climate, peace and security challenges.

xii. Promote closer ASEAN–UN cooperation on advancing climate, peace and security agenda

Given the complex nature of the linkages between climate change, peace and security in Southeast Asia, ASEAN and the UN can consider joint initiatives that will integrate climate change considerations into prevention, mediation and peacebuilding strategies at the regional and national levels. Relevant ASEAN bodies can explore modalities of cooperation with the Climate Security Mechanism (CSM), a joint initiative by the UN Department of Political and Peacebuilding Affairs (DPPA), the UN Development Programme (UNDP), the UN Environment Programme (UNEP), and the UN Department of Peace Operations (DPO), which aims to strengthen the capacity of the UN to systematically analyse and address the linkages between climate change, peace and security, as well as with UN partners at regional and country levels working on these issues in Southeast Asia. ASEAN and the UN can jointly collaborate through regular exchanges and capacity-building workshops by bringing together officials, civil society, and the research community in the region. This would further build and strengthen existing regional capacities, support local solutions, and expand knowledge on climate-related security risks in Southeast Asia. Following the 2023 *A New Agenda for Peace* by the UN,[12] ASEAN and the UN can explore the potential for establishing a joint regional hub on climate, peace and security that will connect national and regional

experiences, provide technical advice to Member States and help accelerate progress, including on how to bridge climate action and peacebuilding.

[11] Tamara Nair and S. Nanthini, “COVID-19 and the Impacts on Women,” NTS Insight IN20-05, July 2020, https://www.rsis.edu.sg/wp-content/uploads/2020/07/NTS-Insight_COVID-19-and-the-Impacts-on-Women-30July2020.pdf; Tamara Nair, “Climate Security and the Role of Women in ASEAN,” RSIS Commentary, 4 April 2023, https://www.rsis.edu.sg/rsis-publication/nts/climate-security-and-role-of-women-in-asean/

[12] United Nations (UN), “Our Common Agenda Policy Brief 9: A New Agenda for Peace” (New York: UN, July 2023).

List of abbreviations

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
AATHP	ASEAN Agreement on Transboundary Haze Pollution
ABRVC	ASEAN BioDiaspora Regional Virtual Centre
ACDM	ASEAN Committee on Disaster Management
ADB	Asian Development Bank
AEC	ASEAN Economic Community
AFSIS	ASEAN Food Security Information System
AHA Centre	ASEAN Coordinating Centre for Humanitarian Assistance on disaster management
AIFS	ASEAN Integrated Food Security
AICHR	ASEAN Intergovernmental Commission on Human Rights
AIPR	ASEAN Institute for Peace and Reconciliation
AMCAP	ASEAN Minerals Cooperation Action Plan
AMR	anti-microbial resistance
APTERR	ASEAN Plus Three Emergency Rice Reserve
ARCH Project	Project for Strengthening the ASEAN Regional Capacity on Disaster Health Management
ASCC	ASEAN Socio-Cultural Community
ASEAN	Association of Southeast Asian Nations
ASEAN DRR-CCA	ASEAN Disaster Risk Reduction by Integrating Climate Change Projection into Flood and Landslide Risk Assessment
AWGCC	ASEAN Working Group on Climate Change
BARMM	Bangsamoro Autonomous Region in Muslim Mindanao
BRN-C	Barisan Revolusi Nasional-Coordinate
CEDAW	Convention for the Elimination of All Forms of Discrimination against Women
EEZ	Exclusive Economic Zone
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
FAO	Food and Agriculture Organization of the United Nations
GDP	gross domestic product
HADR	humanitarian assistance and disaster relief
HDI	Human Development Index
I-EMT	International Emergency Medical Team
IDP	internally displaced persons
IEA	International Energy Agency
IMIP	Indonesia Morowali Industrial Park
INFORM	Index for Risk Management
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
ISCG	Inter Sector Coordination Group
IUU	illegal, unreported and unregulated (fishing)
JOMSRE-SCS	Joint Oceanographic and Marine Scientific Research Expedition in the South China Sea
JTF-HADR	Joint Task Force on Humanitarian Assistance and Disaster Relief
LTMS-PIP	Lao PDR–Thailand–Malaysia–Singapore Power Integration Project
MILF	Moro Islamic Liberation Front
MRC	Mekong River Commission
NGO	non-governmental organisations

NPOAs-IUU	National Plans of Action on Illegal, Unreported and Unregulated Fishing
OAOR	One ASEAN, One Response
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OHHLEP	One Health High-Level Expert Panel
RCCDHM	Regional Coordination Committee on Disaster Health Management
RCP	Representative Concentration Pathways
RPOA-IUU	Regional Plan of Action to Promote Responsible Fishing Practices including Combating Illegal, Unreported and Unregulated Fishing in the Region
SDG	Sustainable Development Goals
SEAFDEC	Southeast Asian Fisheries Development Center
SPA-FS	Strategic Plan of Action on Food Security for the ASEAN Region
SSP	Shared Socioeconomic Pathways
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WPS	Women, Peace and Security

Climate Change and Its Impact on Peace and Security in Southeast Asia

1. Introduction

Climate change is today one of the greatest risks to peace and security, but arguably remains at the margins of policy action amid the loss of trust in multilateral institutions. The impacts of climate change are already felt by local communities in regions on the frontline.[13] While communities have exercised agency to generate local impact and promote trust, the overwhelming impact of climate change necessitates effective state responses, and regional and global cooperation.[14] Global cooperation, in turn, needs to better address the challenges to peace and security faced by regions most exposed to the impacts of climate change.

Southeast Asia is already experiencing direct climate change impacts from changes in temperature, precipitation, sea-level rise, ocean warming, and more frequent and intense extreme weather events. The subsequent indirect climate change impacts on food and water security, and changes in natural resource exploitation and migration patterns, affect the lives and livelihoods of people and communities across the highly diverse region and threaten its peace and security.

While climate change is a global collective-action problem, different states and societies are not affected in the same ways. In the World Economic Forum's *Global Risks Report 2023*, the impact of "natural disasters and extreme weather events" was again ranked the second most important over the next two years and third most important over the next 10 years.[15] According to the report, this risk disproportionately affects low- and middle-income countries,[16] which suggests that the countries of Southeast Asia, most of which fall in the middle (upper or lower) income category,[17] would be particularly affected. Unless climate change is addressed, the Asian Development Bank (ADB) estimates that the region's economy could shrink by 11 percent by the end of the century due to the toll on agriculture, fisheries and tourism.[18]

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[13] Quan-Hoang Vuong, "Western Monopoly of Climate Science Is Creating an Eco-deficit Culture," *Economy, Land and Climate Insight* 11 (2021).
[14] David Lipton, "Trust and the Future of Multilateralism," IMF Blog, 10 May 2018, https://www.imf.org/en/Blogs/Articles/2018/05/10/blog-trust-and-the-future-of-multilateralism
[15] World Economic Forum (WEF), *Global Risks Report 2023* (Geneva: WEF, 2023), 6, https://www3.weforum.org/docs/WEF_Global_Risks_Report_2023.pdf
[16] WEF, *Global Risks Report 2023*, 22.
[17] In FY2021–2022, the World Bank income classification for the countries of Southeast Asia are as follows: Brunei (high), Cambodia (lower middle), Indonesia (lower middle), Lao PDR (lower middle), Malaysia (upper middle), Myanmar (lower middle), the Philippines (lower middle), Singapore (high), Timor Leste (lower middle), Thailand (upper middle) and Vietnam (lower middle). See World Bank, "The World by Income and Region," accessed 1 November 2023, https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html
[18] John Beirne, Nuobu Renzhi, and Ulrich Volz, "Bracing for the Typhoon: Climate Change and Sovereign Risk in Southeast Asia," ADBI Working Paper 1223, Asian Development Bank Institute (ADBI), March 2021, https://www.adb.org/sites/default/files/publication/684891/adbi-wp1223.pdf

This has significant implications for transnational security in the region because the region is connected through supply chains and people movement to the global system.

The impacts of climate change are not only felt in economic terms but also impinge on societal resilience. Climate change and its resulting impacts are now viewed as key drivers of potential instability at all levels of society in Southeast Asia.[19] Vulnerability is higher in locations with poverty, governance challenges and limited access to basic services and resources, recent history of violent conflict, and climate-sensitive livelihoods. This is exacerbated by inequity and marginalisation linked to gender, ethnicity, low income, or combinations of these.[20] These converging risks are a source of major concern for the sustainability of peace and security in Southeast Asia.

1.1 Objectives

The main objective of this report is to provide a broad scan of the cross-cutting impacts of climate change and their implications for peace and security in Southeast Asia. The analysis is guided by three major questions:

- *What* are the consequences of climate change on current problems and challenges to peace and security in Southeast Asia?
- *Who* are the most vulnerable, that is, which are the groups with less adaptive capacity in the face of climate-related security risks?
- *How* can the Association of Southeast Asian Nations (ASEAN) strengthen existing climate change frameworks and enhance regional cooperation to address and manage the multiple climate-related challenges to peace and security in Southeast Asia?

Against the multi-dimensional impact of climate change, this report aims to undertake the following:

- Conduct scanning of climate change impacts on and interlinkages with sustainable development, peace and security risks in the region, taking into account gender, youth, and Indigenous and local community concerns
- Explore the impact of resource extraction and land use issues on environmental sustainability, social cohesion, tensions, and conflicts (e.g., in relation to biofuels or critical minerals for green technologies and industries)
- Examine the extent of migration problems, particularly forced displacement and human trafficking, as exacerbated by climate change-induced crises in the region

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[19] Elliot Brennan, "Climate Change and Security Threats in Southeast Asia," in *Handbook of Security and the Environment*, ed. Ashok Swain, Joakim Öjendal, and Anders Jägerskog (Cheltenham, UK: Edward Elgar Publishing, 2021), https://doi.org/10.4337/9781789900668

[20] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2023: Synthesis Report* (Geneva: IPCC, 2023), https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf

- Assess the vulnerabilities of coastal communities and fishers in the region to illegal, unreported and unregulated (IUU) fishing, which could be amplified by the effects of climate change on fish stocks and marine resources; and the impacts on the wider population
- Investigate climate-sensitive health risks, emerging infectious diseases, exposure pathways, vulnerability factors, and health system capacity and resilience in the region
- Identify transboundary, spillover effects of climate change among the countries of Southeast Asia and the implications for vulnerable populations (women and children, youth, migrants, minority and Indigenous groups)
- Recommend pathways to enhanced climate action and peace and security initiatives in the region; entry points for ASEAN; and areas for further research.

1.2 Methodology

This assessment is framed in terms of the impacts of climate change on socio-economic challenges, political-security fault lines, and geo-political dynamics in Southeast Asia as a region disproportionately exposed to climate change. It is a preliminary assessment of regional thematic issues on the subject of the climate change, peace and security nexus in Southeast Asia, illustrated with selected examples and case studies. As such, this report could serve as a foundational exploratory study for future baseline studies on climate change, peace and security issues in Southeast Asia.

This assessment uses a **comprehensive security** lens to identify dominant direct and indirect climate impacts, provide an overview of key climate change challenges in Southeast Asia, and identify the implications for peace and security in the region, with particular attention on vulnerable groups. It then outlines key policy pathways, focusing on ways to deepen regional cooperation in managing the unfolding consequences of climate change.

The report analyses the data collected through desk research and a systematic review of academic and policy-oriented research on climate change and sustainability issues in Southeast Asia as well as reports on peace and security challenges published by international institutions, ASEAN, and non-state organisations.

Technical consultation meetings were conducted in selected ASEAN countries, both in person and online, to gather Southeast Asian perspectives and verify desk research findings.

1.3 Climate, peace and security: Adopting a comprehensive security approach

Comprehensive security is the organising concept of security in Southeast Asia, integrated and widely reflected in the security lexicon in the region, and already underpins how the region understands and deals with the cross-cutting impacts of climate change on its peace and security.

Unlike the conventional notion of security, which is narrowly defined to mean defending state borders from military attack, comprehensive security is a much broader conceptualisation of security that "[goes] beyond (but does not exclude) the military threats to embrace the political, economic and socio-cultural dimensions".[21] Comprehensive security not only provides a broader understanding of security but is also an inclusive concept that brings in multiple referents of security beyond the state.[22]

This concept also accounts for the disaggregated impacts of security threats on marginalised and disadvantaged social groups, such as people with disabilities, women, ethnic minorities, migrants and rural populations. Thus, in the context of a changing climate, comprehensive security allows for a better understanding of the linkages between climate change and peace and security in the region, reflecting the multi-layered and polycentric governance processes in Southeast Asia that facilitate or limit the effective coordination of actors, information and resources.

The region is home to populations of diverse religions, ethnicities, cultural groups and political systems. Economic interests and economic development are a common thread that promotes stability and security within and between states across the region. Against this backdrop, ASEAN member states collectively recognise the potential impact of climate change on the basic needs for human life, particularly for already vulnerable groups that would be disproportionately affected by the impacts.[23] In other words, the notion of climate, peace and security for the region goes beyond the concern about the potential for violent conflicts to also include economic, political and socio- cultural dimensions.

Against the current global discourse on climate, peace and security, some Southeast Asian countries have argued that the security dimension of climate change should not be seen exclusively in terms of armed conflict. The relationship between climate

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[21] Muthiah Alagappa, "Comprehensive Security: Interpretations in ASEAN Countries," in *Asian Security Issues: Regional and Global,* ed. Robert A. Scalapino et al. (Berkeley, CA: Institute of East Asian Studies, University of California, 1988).
[22] Alagappa, "Comprehensive Security."
[23] Association of Southeast Asian Nations (ASEAN), "ASEAN Joint Statement on Climate Change to the 27th Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP-27)," 22 November 2022, https://asean.org/wp-content/uploads/2022/11/33-ASEAN-Joint-Statement-on-Climate-Change-to-UNFCCC-COP-27.pdf

and conflict is not linear. It is complex, nuanced and context-specific.[24] As such, conflict should be seen as a spectrum, ranging from societal differences and tensions, to state–society differences and political instability and armed violence at the extreme end. That said, climate change and conflict, separately and together, undermine livelihoods, hinder adaptation and weaken social cohesion. It is therefore important to appreciate how climate security is framed and understood in Southeast Asia and the interconnections between the effects of climate change and current and extant security challenges in the region.

The severe human security challenges brought on by climate change are more than enough for the countries of Southeast Asia to consider climate change as a real and existential threat.[25] Equally important is the need to recognise the transnational consequences of sea-level rise, competition over water and marine resources, and forced displacement of already vulnerable groups. Managing these intersectionality and cross-border implications compels states and societies to work together while strengthening and deepening regional cooperation.

Across Southeast Asia, countries have committed to a "people-centred" approach that leaves no one behind in addressing contemporary security challenges. This includes climate change, as outlined in the ASEAN Community Vision 2025. ASEAN member states have further committed to the gender-responsive implementation of this vision and the United Nations Sustainable Development Goals.[26] These commitments reflect ASEAN's comprehensive approach to security in the region.

Therefore, the comprehensive security framework allows for an inclusive approach that acknowledges the multiple actors and layers of governance needed to address "the complex and urgent challenges of poverty, growing inequality, climate change, conflict and fragility" outlined in the 2030 UN Agenda for Sustainable Development.

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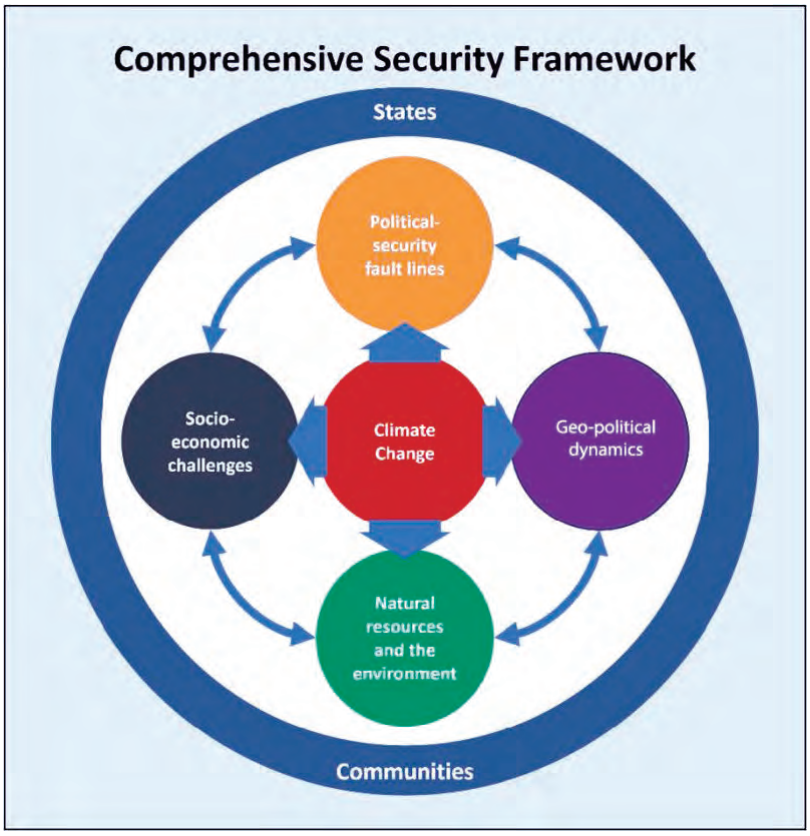
[24] Ariel R. Penaranda, "Threats to International Peace and Security: 'Sea-Level Rise – Implications for International Peace and Security'" (speech to the United Nations Security Council, New York, 14 February 2023), https://www.un.int/philippines/statements_speeches/threats-international-peace-and-security-"sea-level-rise-implications

[25] Chee Hean Teo, "Global Action for a More Sustainable World" (speech at the *Ministerial Conference on Sustaining Peace amidst the Climate Crisis*, 2 May 2022), https://www.pmo.gov.sg/Newsroom/SM-Teo-Chee-Hean-at-the-Ministerial-Conference-on-Sustaining-Peace-Amidst-the-Climate-Crisis

[26] ASEAN, "ASEAN Community Vision 2025," November 2015, https://www.asean.org/wp-content/uploads/images/2015/November/aec-page/ASEAN-Community-Vision-2025.pdf

Figure 1.1 Comprehensive security framework



Source: Authors.

This report investigates the impacts of climate change on key socio-economic challenges, political-security fault lines, and geo-political dynamics in Southeast Asia. The section on socio-economic challenges identifies economy, food, health, water, natural resources, natural hazards, gender and forced migration as key loci for the impacts of climate change on peace and security in the region.

Climate change has heightened food insecurity, by reducing food production, increasing food prices, and disrupting food distribution. Further, extreme heat exposure and increase in vector-borne diseases as temperatures rise, and the cascading impacts, pose significant threats to human health. On mainland Southeast Asia, rivers have long been a source of livelihood and power generation to support national economic growth. As countries search for energy alternatives to fossil fuels to reduce greenhouse gas emissions, river systems like the Mekong River have become important components of energy mixes. The increasing importance of hydropower provides opportunities for local communities and for relations between states connected by these river systems, but also has the potential to heighten both socio-economic risks and political-security fault lines.

Likewise, the shift to electric vehicles, wind power and solar energy as part of green energy transitions has seen an increase in demand for critical minerals to produce the supporting turbines and batteries. Southeast Asia is home to significant mineral deposits, which would make it an increasing site for natural-resource competition, impacting the lives and livelihoods of local communities, and changing the peace and security dynamic in the region.

As extreme weather events increase, the region will face more acute direct challenges to the survivability of exposed communities, again with cascading impacts, including socio-economic issues disproportionately affecting already vulnerable groups. These could drive migration in new directions, with important implications for local communities and inter-state relations.

If left unaddressed, climate change may exacerbate pre-existing and historical tensions both internally and between countries in Southeast Asia and the wider region. Internal conflicts have long posed a challenge for peace and security in the region. In the section on political-security fault lines, several thematic issues highlight the impacts of climate change on internal conflicts in Southeast Asia.

The exposure of affected communities in the southern Philippines to more extreme weather events will overlay the pre-existing tensions in Mindanao. In Myanmar, the increased interest of countries in hydropower and minerals will likely exacerbate the ongoing internal conflict. Climate change will further complicate geo-political dynamics emanating from inter-state security challenges in the Mekong Sub-region and IUU fishing in the South China Sea. The Mekong River connects Cambodia, China, Lao PDR, Myanmar, Thailand and Vietnam. As interest in hydropower increases, the transboundary water management issue among the Mekong countries could only become more complex, and would also likely be exacerbated by changes to the river due to climate change. In the South China Sea, sea-level rise and a warming ocean will further influence the trajectory of disputes, with the movement of fish stock and the submergence of islands shifting the contours of disputes between claimant states and with wider fishing interests.

The report concludes with key findings from these investigations and provides recommendations for charting a way forward that factors in the impacts of climate change and contributes to sustainable peace and security in Southeast Asia.

2. State of Climate Change in Southeast Asia

Climate change as a phenomenon with global impacts has long been understood to influence our lives and livelihoods and the stability of our social and political environments. Yet, climate impacts have evaded many political and security calculations in Southeast Asia, despite being a significant threat to sustainable peace.

With global temperatures likely to cross 1.5°C of warming within the next five years, risk multipliers in the form of rising sea levels, extreme weather events, warming temperatures, changing rainfall patterns, loss of biodiversity and ecosystems, health impacts, threats to food and water security, economic impacts, migration and displacement, infrastructure vulnerability, and political and security challenges[27] are likely to be exacerbated (see Table 2.1). These impacts will likely contribute to and further complicate the risk landscape ("riskscape") in Southeast Asia, already one of the most disaster-prone regions in the world.[28] Further, the region's economy could face an 11% downturn as a result of the various impacts of climate change,[29] as they could exacerbate health, food, water and gender inequities as well as disaster vulnerability and exposure gaps.

Table 2.1 Climate change impact on temperature, precipitation and sea-level rise

Country	Observed			Projections until 2100			
	Temp. (°C) rise	Precipi-tation	Extreme weather events	Temp. (°C) rise	Precipi-tation	Sea-level rise	Extreme weather events
Brunei Darussalam	0.6°C between 1970 and 2014	10.8mm per year increase until 2100 (RCP 8.5)	Riverine and extreme rainfall floods,high rainfall variability, droughts	0.5°C per decade for next 30 years until 2100 (RCP 8.5)	10.8mm per year until 2100 (RCP 8.5)	0.44–0.45m	Increase in sea-level rise in next 30–50 years, increase in unpredictable extreme rainfall events resulting in flash floods and landslides

[27] IPCC, "Fact Sheet – Asia: Climate Change Impacts and Risks," October 2022, https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Asia.pdf

[28] World Meteorological Organization (WMO), "The Global Climate in 2015–2019" (Geneva: WMO, 2019), https://library.wmo.int/doc_num.php?explnum_id=9936; Gloria Dickie, "'More Likely than Not' World Will Soon See 1.5 Degrees Celsius of Warming, World Meteorological Organization Says," *Reuters*, 18 May 2023, https://www.reuters.com/business/environment/more-likely-than-not-world-will-soon-see-15c-warming-wmo-2023-05-17/

[29] Asian Development Bank (ADB), "When It Comes to Fighting Climate Change, Green is Golden," 22 March 2023, https://www.adb.org/news/features/when-it-comes-fighting-climate-change-green-golden

Country	Observed			Projections until 2100			
	Temp. (^{0}C) rise	Precipi-tation	Extreme weather events	Temp. (^{0}C) rise	Precipi-tation	Sea-level rise	Extreme weather events
Cambodia	0.8^{0}C since 1980	General increase in rainfall	Riverine and extreme rainfall floods, high rainfall variability, and droughts	1.6^{0}C (SRES B1); 2.5^{0}C (SRES A2)	3–35% increase (SRES A2)	1.7cm per year (SRES A2)	Increase in extreme rainfall events, droughts and floods
Indonesia	0.01–0.06^{0}C per year since 1950	General increase in rainfall	Riverine and significant flash floods, forest fires, strong winds and landslides	0.5^{0}C per decade in the next 30 years until 2100 (RCP 8.5)	10.8mm per year until 2100 (RCP 8.5)	0.44–0.45m	Increase in sea-level rise in next 30–50 years, increase in unpredictable extreme rainfall events resulting in flash floods and landslides
Lao PDR	0.05^{0}C per year in the past 40 years	Increased	Increase in extreme rainfall events, drought, and flood events	1.4–4.3^{0}C	10–30% in eastern, southern parts	Not relevant	Increase in extreme flood and drought events
Malaysia	0.13–0.24^{0}C per decade since 1969	Unclear long-term trend	Increase in rainfall intensity	1.2–1.6^{0}C (SRES) by 2050	7.1–10.6% increase by 2050	0.11–0.21m (SRES) by 2050	Increase in extreme flood and drought events
Myanmar	0.3–0.8^{0}C from 1971 to 2000	Increased March to November; decreased rest of year	Increasing intensity and landfall of cyclones, droughts, and floods	1.2–2.5^{0}C (A1T); 2.8–3.5^{0}C (A2)	10% increase during March to November	0.2–0.6m	Increase in extreme hot days
Philippines	0.62^{0}C during 1958–2014	Increased intense rainfall	Increase in extreme rainfall events, increase in hot days, droughts, forest fires, change in typhoon behaviour	1.8–2.2^{0}C (A1B)	-9.5% to 27.8% (A1B)	0.2m	Increase in extreme rainfall events, hot days, change in typhoon behaviour, storm surge in coastal areas
Singapore	0.25^{0}C per decade from 1948 to 2015	67mm per decade average rate of increase from 1980 to 2019	General uptrend in annual average rainfall, from 2,192mm (1980) to 2,727mm (2014)	1.4–2.7^{0}C (RCP 4.5); 2.9–4.6^{0}C (RCP 8.5) mean daily temperature change for the years 2070–2099, relative to the period of 1980–2009	Increasing trends in both intensity and frequency of heavy rainfall events	0.30–0.74m (RCP 4.5); 0.45–1.02m (RCP 8.5) by 2100 relative to the period of 1986–2005	Increased contrast between wet months and dry months, with increasing intensity and frequency of heavy rainfall events
Thailand	1.04^{0}C during 1970–2009	64.8mm in East-Coast Gulf	Increase in hot days, extreme flood events	0.9–1.8^{0}C (RCP 2.6); 2.0–3.1^{0}C (RCP 8.5)	(-)66–193mm (RCP 2.6); (-)19–191mm (RCP 8.5)	1–2m	Increase in hot days, increase in high rainfall events

Country	Observed			Projections until 2100			
	Temp. (^{0}C) rise	Precipi-tation	Extreme weather events	Temp. (^{0}C) rise	Precipi-tation	Sea-level rise	Extreme weather events
Vietnam	0.62^{0}C during 1958–2014	2.6% during 1958–2014	Increase in droughts, extreme rainfall events, super typhoons and typhoon period	1.7–2.4^{0}C (RCP 4.5); 3.0–4.0^{0}C (RCP 8.5)	5–15% (RCP 4.5); 20% (RCP 8.5)	0.53m (RCP 4.5); 0.73m (RCP 8.5)	Increase in strong and very strong typhoons, intensity of droughts, number of hot days.

Note: RCP 2.6 refers to the CO_2 concentration being slowly reduced toward 360 ppm by 2300 (in comparison to 2,000 ppm in the RCP 8.5 scenario); RCP 4.5 refers to the intermediate scenario for reductions in carbon emissions; RCP 8.5 is the "business-as-usual" (high emissions) scenario. SRES refers to the Special Report Emissions Scenarios and are grouped into A1, A2, B1, B2.
Source: ASEAN, *ASEAN State of Climate Change Report* (Jakarta: ASEAN Secretariat, 2021), 40.

2.1 Areas at risk in Southeast Asia

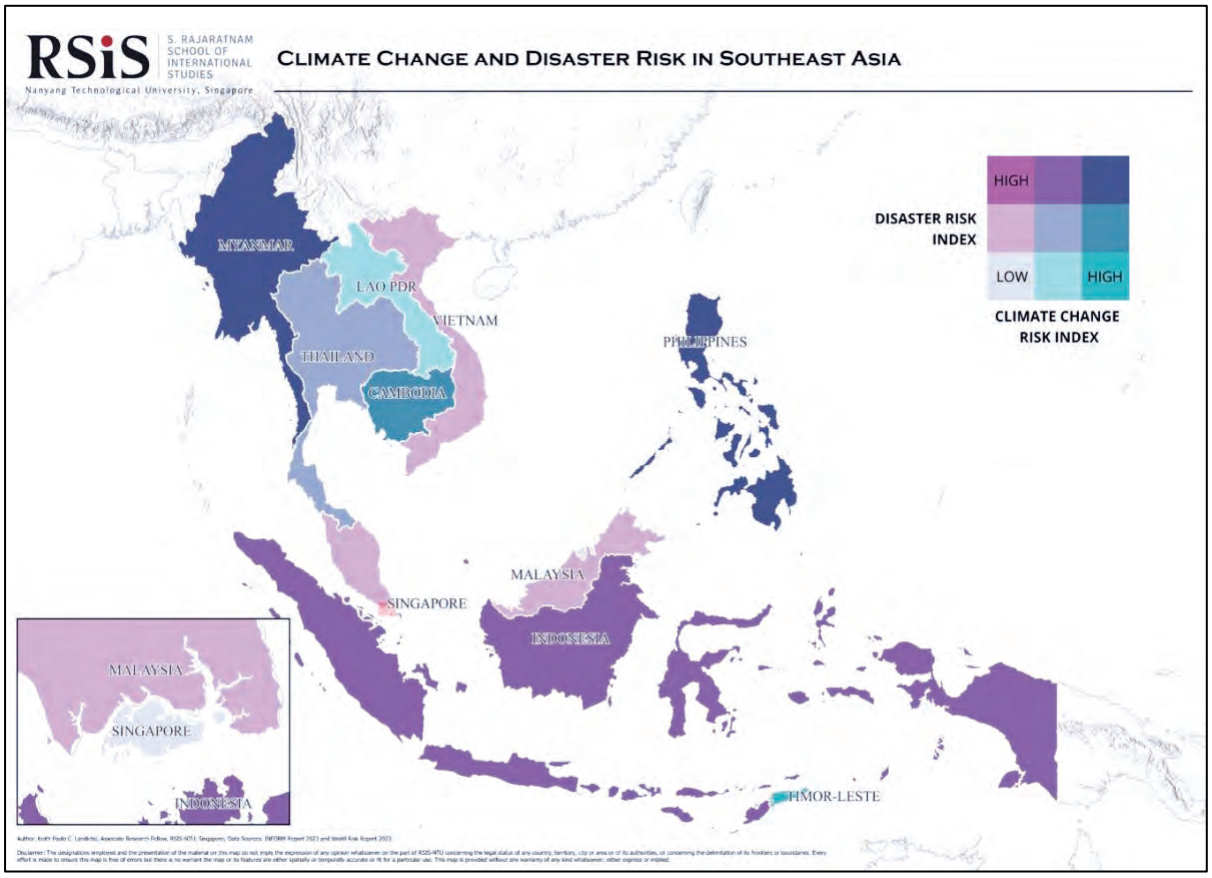
The Sixth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC) titled *Climate Change 2022: Impacts, Adaptation and Vulnerability* highlights that Southeast Asia is likely to face significant increases in extreme weather events, which are in turn likely to lead to food insecurity and increased migration flows – all drivers of further instability for the region.[30]

The INFORM Climate Change Risk Index, featured in the *INFORM Annual Report 2023*, provides a comprehensive analysis of future scenarios by synthesising two critical components: the physical aspects, represented by Representative Concentration Pathways (RCPs), and the socio-economic factors, encapsulated within the Shared Socioeconomic Pathways (SSPs).[31] The World Risk Index, as found in *WorldRiskReport 2023*, computes disaster risk as an outcome of exposure to various natural hazards, including geophysical, hydrological and meteorological factors, combined with the vulnerability components such as susceptibility, lack of coping capacities, and lack of adaptive capacities.[32]

By examining both climate change risk and disaster risk concurrently as shown Figure 2.1, valuable insights into the countries of Southeast Asia that are most susceptible to disasters, especially when considering the compounding effects of climate change, can be identified.

[30] IPCC, "Fact Sheet – Asia."
[31] European Commission, Joint Research Centre, *INFORM Report 2023 – Shared Evidence for Managing Crises and Disasters* (Luxembourg: Publications Office of the European Union, 2023), https://data.europa.eu/doi/10.2760/073809
[32] Bündnis Entwicklung Hilf and IFHV, *WeltRisikoBericht 2023* [WorldRiskReport 2023] (Berlin: Bündnis Entwicklung Hilft, 2023).

Figure 2.1 Climate change and disaster risk in Southeast Asia



Source: Authors.

As shown in Figure 2.1, Myanmar and the Philippines are the most at risk, to climate change in baseline (current), pessimistic and optimistic scenarios for the mid-century (~2050) and end century (~2080) projections, as well as to disasters.

Warmer temperatures are likely to result in heat waves and harsher drought,[33] which could potentially affect Myanmar, the northern portions of Vietnam, and parts of Indonesia (Papua) (Figure 2.2a). Such impacts could cascade to food and water security risks, with agriculture and freshwater resources being affected.[34] Singapore could be vulnerable to heat stress and its corresponding health risks.[35] Indonesia could experience more frequent and intense forest fires and haze from the dry conditions, affecting air quality and biodiversity.[36]

[33] IPCC, "Fact Sheet – Asia."
[34] IPCC, "Fact Sheet – Asia."
[35] Ministry of the Environment and Water Resources (MEWR) and Ministry of National Development (MND), Singapore, "Singapore's Climate Action Plan: A Climate-Resilient Singapore, for a Sustainable Future," (Singapore: MEWR and MND, 2016), https://sustainabledevelopment.un.org/content/documents/1549Climate_Action_Plan_Publication_Part_2.pdf
[36] United Nations Indonesia, "Climate Change: Effects," accessed 7 November 2023, https://indonesia.un.org/en/172909-climate-change

The changing rainfall patterns could also affect food and water security, particularly in countries dependent on agriculture (Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, Vietnam) as shown in Figure 2.2a. Changing patterns will have potential cascading effects on health security, such as vector-borne and water-borne diseases, undernutrition, mental disorders and allergy-related illnesses.[37]

Increased typhoon intensity and frequency could result in severe flooding and inundation, which could affect coastal and riparian communities in Myanmar, the northern and central portions of the Philippines, and the southwest and central regions of Vietnam (Figure 2.2b), and lead to rainfall-induced landslides (Figure 2.2c) in the mountainous areas, especially those in the periphery of the typical cyclone/typhoon tracks (Figure 2.2d). This comes as a result of warmer temperatures enabling favourable environments for cyclone genesis.[38]

Rising sea level could also affect coastal cities, communities and ecosystems in Indonesia, the Philippines, Singapore and Thailand (Figure 2.2b). That could have implications such as saltwater intrusion into the Mekong Delta, which would affect food security (rice cultivation and aquaculture); major urban areas may also be inundated, which could result in displacement and health risks.[39]

The *WorldRiskReport 2023* underscores Southeast Asia's susceptibility to the effects of climate change; among the countries deemed to have the highest disaster risk are the Philippines (1st), Indonesia (2nd), Myanmar (6th) and Vietnam (15th).[40]

[37] IPCC, "Fact Sheet – Asia."
[38] William N. Holden and Shawn J. Marshall, "Chapter 24 –Climate Change and Typhoons in the Philippines: Extreme Weather Events in the Anthropocene," in *Integrating Disaster Science and Management,* ed. Pijush Samui, Dookie Kim, and Chandan Ghosh (Elsevier, 2018), https://doi.org/10.1016/B978-0-12-812056-9.00024-5
[39] IPCC, "Fact Sheet – Asia."
[40] Bündnis Entwicklung Hilf and IFHV, [WorldRiskReport 2023].

Figure 2.2 Climate change: Areas at risk in Southeast Asia

a Increased drought and rainfall hazards (Standard Precipitation Index 2000–2020)
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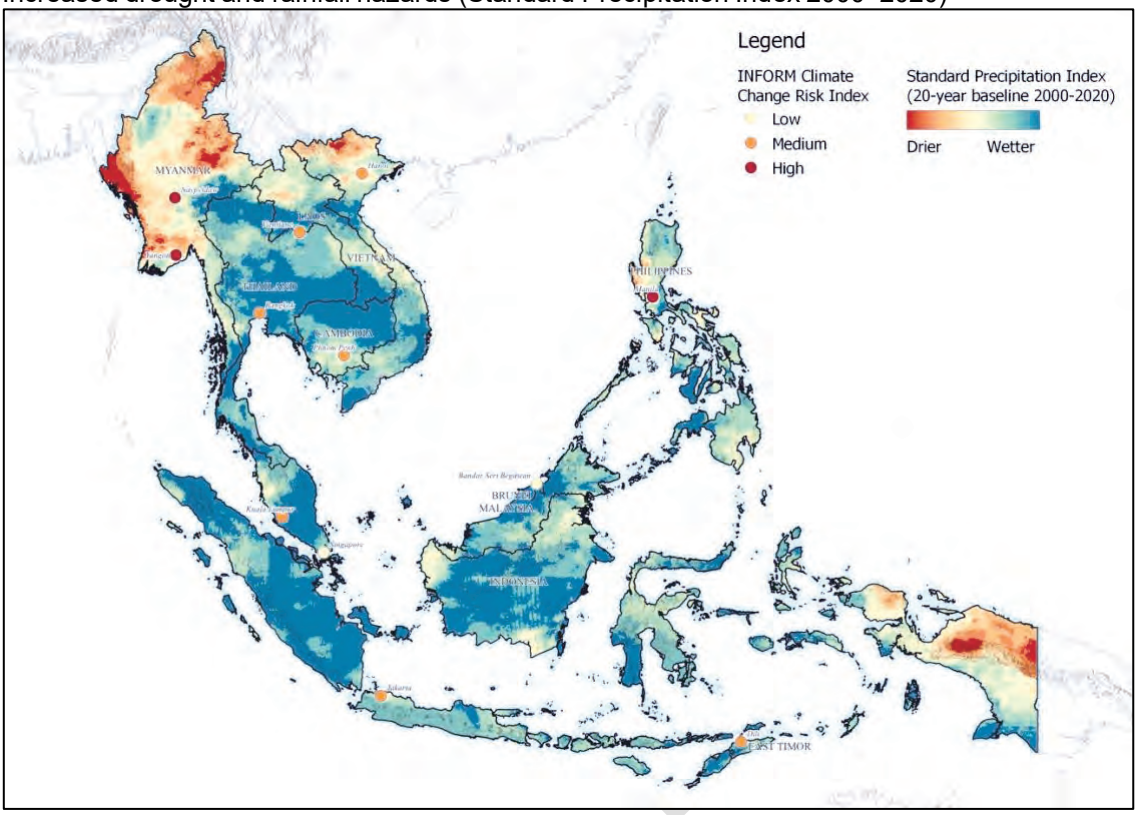

b Coastal and riverine flood hazards (100-year return period)
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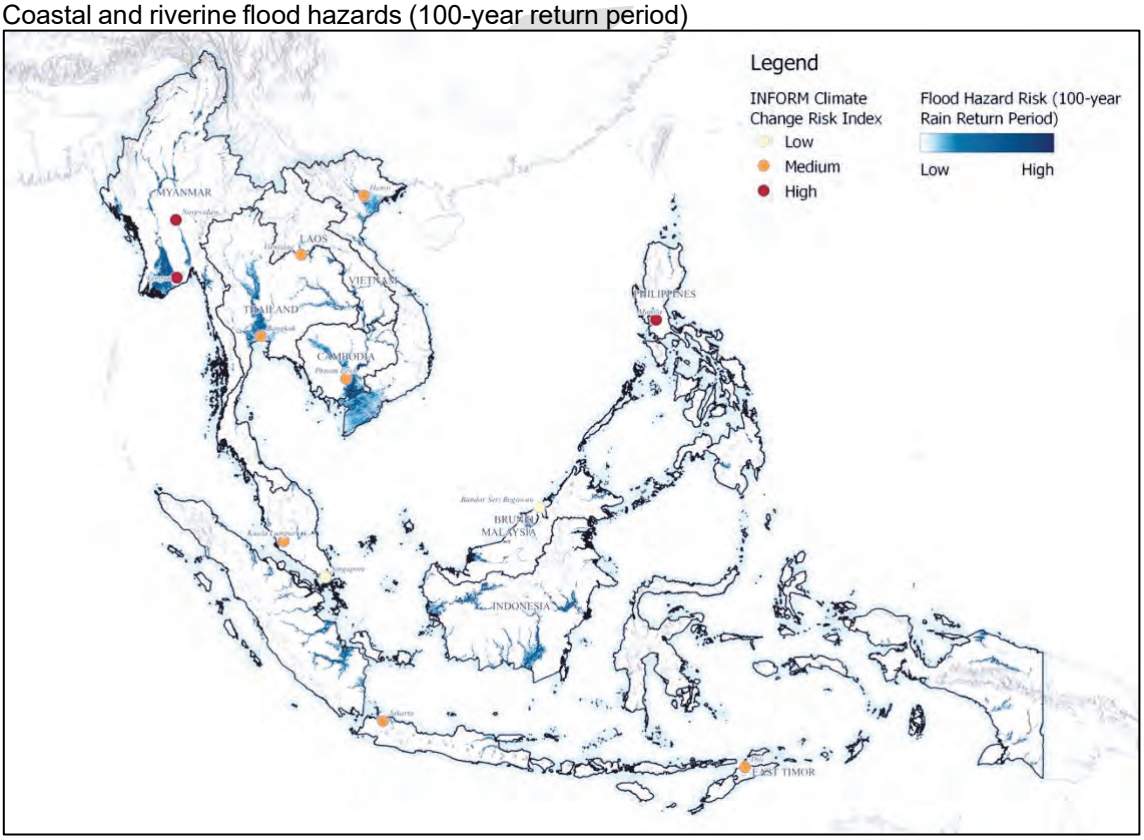

c Rainfall-induced landslides

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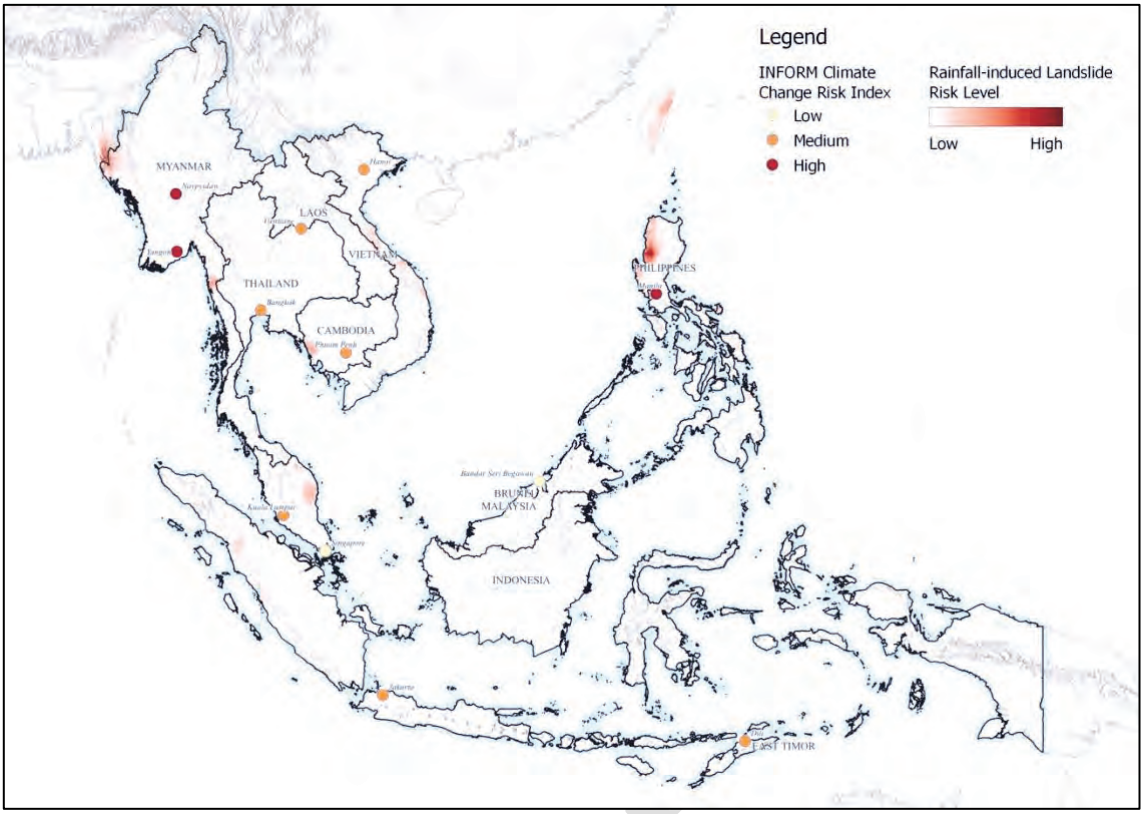

d Cyclone hazards (100-year)

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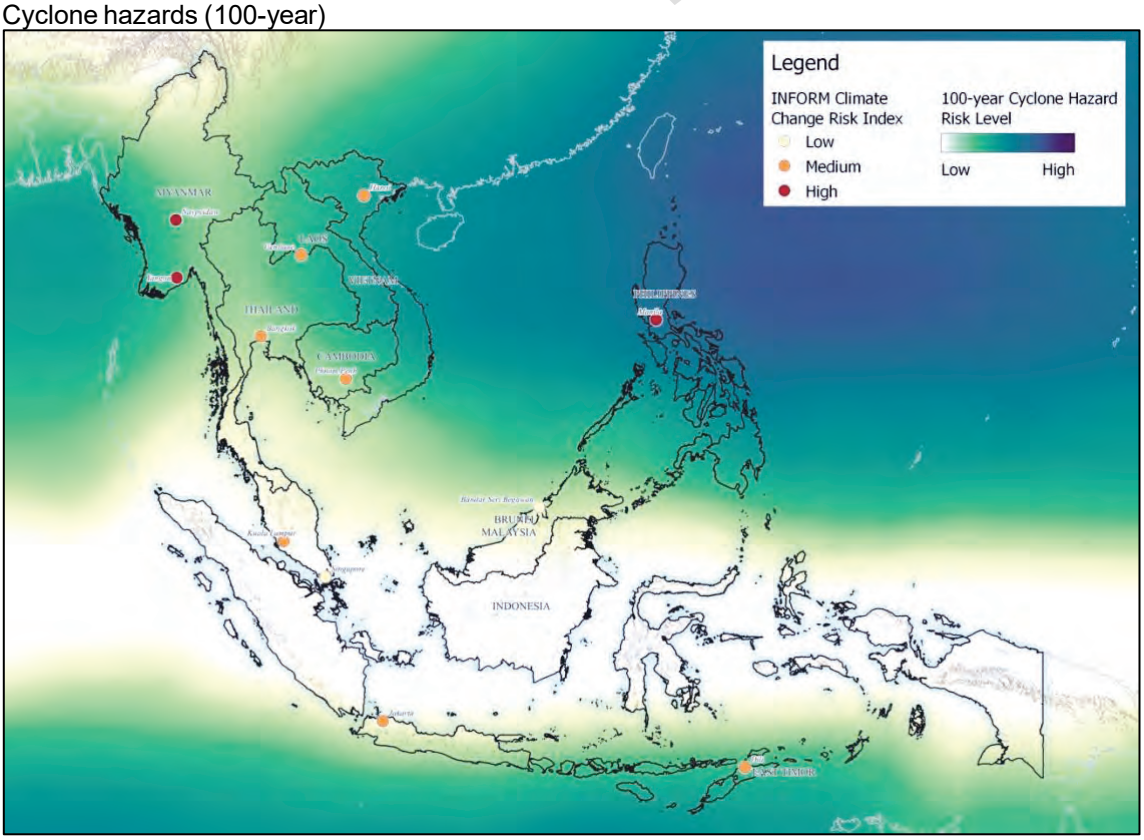


Source: Authors.

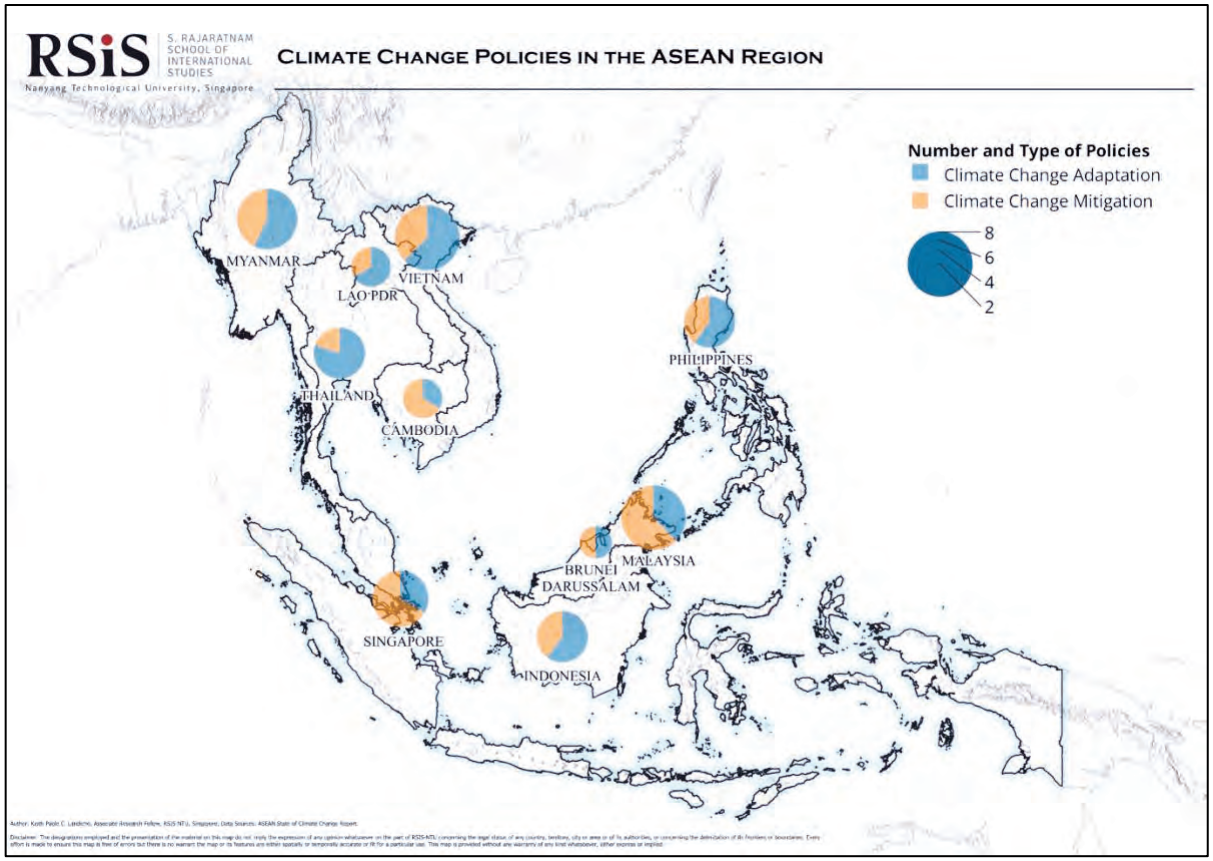
2.2 National and regional frameworks

An increasing proportion of the region's recent disaster events has been linked to climate change and/or environmental degradation, and this has led to climate-related security challenges and issues becoming a key concern in the region.

Through ASEAN, climate change has become a regional priority. This is reflected through the active participation of ASEAN in the UN Framework Convention on Climate Change (UNFCCC).

In addition, ASEAN member states have individually been progressively adopting climate change adaptation and mitigation frameworks and strategies (Figure 2.3; Table 2.2; Table 2.3)

Figure 2.3 Indicative climate change adaptation and mitigation policies in the ASEAN region



Source: Authors.

Table 2.2 Summary of indicative climate change adaptation strategies/vision in the ASEAN region

Country	Indicative adaptation strategies/vision	Target year
Brunei Darussalam	Brunei Darussalam National Climate Change Policy (BNCCP)	2035
Cambodia	National Strategic Plan on Green Growth 2013–2030	2030
Indonesia	Low Carbon Development Initiative (LCDI)	2045
	Roadmap NDC Adaptation	2030
	National Green Growth Strategy (LTS LCCR)	2050
Lao PDR	National Green Growth Strategy (NGGS)	2030
	Agriculture and Forestry Research Strategy (AFRS) 2025 and the "Vision up to 2030"	2030
Malaysia	National Renewable Energy Policy and Action Plan 2011	2030
	Shared Prosperity Vision 2030	2030
	Roadmap for the Water Sector Transformation 2040	2040
Myanmar	Myanmar Climate Change Master Plan (2018–2030)	2030
	Myanmar Sustainable Development Plan 2018–2030	2030
	Myanmar Climate Change Policy (2019)	2030
	Myanmar Climate Change Strategy (2018-2030)	2030
Philippines	Local Climate Change Adaptation Plan (LCCAP) Climate Disaster Risk Assessment (CDRA) and National Climate Risk Management Framework (NCRMF)	2030/2050
Singapore	Singapore's Long-term Low-emissions Development Strategy	2050
	Singapore Green Plan 2030	2030
Thailand	Climate Change Master Plan 2015–2050	2050
	Thailand 4.0	-
	National Strategy 2018–2037	2037
	National Adaptation Plan (NAP) 2018–2037	2037
Vietnam	National Climate Change Strategy	2050
	National Green Growth Strategy	2050
	Strategy for Vietnam's Low-emission Development and Green Growth by 2050	2050
	Resolution No.55-NQ/TW	2045
	National Plan on Climate Change Adaptation for 2021–2030	2030/2050

Source: ASEAN, *ASEAN State of Climate Change Report* (Jakarta: ASEAN Secretariat, 2021), 59–61.

Table 2.3 Summary of indicative climate change mitigation strategies/vision in the ASEAN region

Country	Indicative mitigation strategies/vision	Target year
Brunei Darussalam	Brunei Darussalam National Climate Change Policy (BNCCP)	2035
Cambodia	National Strategic Plan on Green Growth 2013–2030	2030
	National Policy and Action Plan on Energy Efficiency (NPAPEE) 2018–2035	2035
Indonesia	Government Regulation No. 79/2014 on National Energy Policy	2050
	Indonesia Long-term Strategy for Low Carbon and Climate Resilience (LTS-LCCR) 2050	2050
Lao PDR	National Green Growth Strategy (NGGS)	2030
Malaysia	National Renewable Energy Policy and Action Plan 2011	2030
	Land Public Transport Master Plan	2030
	National Automotive Policy 2014 and National Electric Mobility Blueprint	2030
	National Forestry Policy 1978; National Biological Diversity Policy; REDD Plus Strategy	2030
Myanmar	Myanmar Climate Change Policy (2019)	2030
	Myanmar Climate Change Master Plan (2018–2030)	2030
	Myanmar Climate Change Strategy (2018–2030)	2030
Philippines	Philippine Energy Plan (2018–2040)	2040
	National Energy Efficiency and Conservation Programme (NEECP) second version	2040
Singapore	Singapore's Long-term Low-emissions Development Strategy	2050
	Singapore Green Plan 2030	2030
	Phase out internal Combustion Engine (ICE) Vehicles; Switching from ICE buses to electric buses	2040
	Energy Self-sufficiency and Sludge Reduction in Used Water Treatment	2060
Thailand	Climate Change Master Plan 2015–2050	2050
Vietnam	National Climate Change Strategy	2050
	National Green Growth Strategy	2050
	Strategy for Vietnam's Low-emission Development and Green Growth by 2050	2050

Source: ASEAN, *ASEAN State of Climate Change Report* (Jakarta: ASEAN Secretariat, 2021), 89–91.

With the aim of building adaptive capacity and resilience to climate-related security challenges in the region, ASEAN has incorporated numerous initiatives to respond to climate change. This section provides an overview of ASEAN's relevant policy frameworks and implementing bodies regarding climate change.

First established in 2009, the role of the ASEAN Working Group on Climate Change (AWGCC) is to implement relevant actions set out in the ASEAN Socio-Cultural Community (ASCC) Blueprints 2009–2015 and the ASCC Blueprint 2025 through the formulation and implementation of AWGCC Action Plan. As a consultative and collaborative platform to enhance regional cooperation and action to address the adverse impacts of climate change, the AWGCC has also formulated joint statements on climate change for ASEAN, including one to the 27th session of the Conference of the Parties to the UNFCCC (or COP27).[41] As part of its mandate to promote coordination and collaboration among various ASEAN sectoral bodies and national governments, the AWGCC has been involved in other climate change-related reports, including the *ASEAN State of Climate Change Report* published in 2021.

The *ASEAN State of Climate Change Report* aimed to provide an overall regional outlook on the state of play in Southeast Asia.[42] This report can be used to help guide and support ASEAN member states in performing the stocktaking exercise that would be undertaken every five years from 2023 onward under their commitments to the Paris Agreement. By providing a framework for transparency and transformative action to mitigate and adapt to climate change, the report is the first step toward a collective ASEAN climate action vision, and specifically includes future priority actions to be achieved by 2030 and 2050.

The vision includes recognising that climate change would have negative impacts on basic needs such as food, water, energy, a clean and green environment and health, along with the potential for climate change to exacerbate drivers of conflict, by undermining livelihoods, weakening social cohesion and creating resource competition. In other words, ASEAN considers climate security for the region as entailing both a socio-economic dimension as well as a political-security dimension.

[41] ASEAN, “ASEAN Joint Statement on Climate Change to COP27.”
[42] ASEAN, *ASEAN State of Climate Change Report* (Jakarta: ASEAN Secretariat, 2021).

3. Climate Change and Socio-economic Challenges in Southeast Asia

3.1 Climate change and economic security

Even as ASEAN seeks to promote the ASEAN Economic Community, it is important to recognise that climate change has been projected to have continuing negative impacts on the region's economic growth prospects. Economic impacts have been calculated from various perspectives, including trade, natural hazards, and human capital development.

The impacts on economic growth are likely to vary depending on the locations and types of industry. Changes in temperature and precipitation could adversely affect gross domestic product (GDP) growth, including through their effect on productivity in the agriculture, manufacturing and services sectors, as well as on human capital.[43] From 1970 to 2021, the World Meteorological Organization computed that USD 4.3 trillion were lost to disasters globally, of which a third was within Asia at USD 1.4 trillion; floods were found to be the leading cause.[44] A 2021 study by ASEAN likewise reveals diverse impacts within the region, across countries and also sectors such as water management, agriculture and food security, tourism, health, natural resource management, human settlement and security. Regional impacts are estimated to total USD 18–19 billion up to 2050, as summarised in Table 3.1.[45]

Trade plays an important role in economic growth, and disruptions to transport and storage at ports represent systemic vulnerabilities for economies. On average, globally, 80% of trade volumes pass through ports, with 50% of trade being maritime in nature.[46] Climate-related hazards can cause trade disruptions.[47] An estimated USD 81 billion of global trade, and USD 122 billion of total economic activity, are at risk annually from climate disruptions. [48]

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[43] Naeem Akram, "Is Climate Change Hindering Economic Growth of Asian Economies," *Asia-Pacific Development Journal* 19, no. 2 (2012): 1–18. https://www.unescap.org/sites/default/files/chap-1-Akram.pdf
[44] WMO, "WMO Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970–2019)" (Geneva: WMO, 2021), https://library.wmo.int/records/item/57564-wmo-atlas-of-mortality-and-economic-losses-from-weather-climate-and-water-extremes-1970-2019
[45] ASEAN*, ASEAN State of Climate Change Report.*
[46] Jasper Verschuur, Elco E. Koks, and Jim W. Hall, "Ports' Criticality in International Trade and Global Supply-chains," *Nature Communications* 13, no. 4351 (2022), https://doi.org/10.1038/s41467-022-32070-0
[47] Cristina Izaguirre et al., "Climate Change Risk to Global Port Operations," *Nature Climate Change* 11, no. 1 (2021), https://doi.org/10.1038/s41558-020-00937-z
[48] Jasper Verschuur, Elco E. Koks, and Jim W. Hall, "Systemic Risks from Climate-related Disruptions at Ports," *Nature Climate Change* 13 (2023): 804, https://doi.org/10.1038/s41558-023-01754-w

Table 3.1 Key sectors impacted by climate change (sea-level rise and heat stress) by 2050

Country	Sea-level rise				Heat stress		Key sectors impacted
	Inundated area (km^2)		Economic impact (billion USD)		Heat mortality (no. of deaths per 1,000 km^2)		
	RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5	
Brunei Darussalam	7	95	78	62	0.88	0.86	Agriculture, water resources, fisheries, health, forestry, biodiversity
Cambodia	1,495	1,474	676	660	4.26	4.11	Agriculture, coastal zones, energy, human health, industry, infrastructure, tourism, water resources, fisheries, livelihoods, poverty, biodiversity
Indonesia	20,671	19,968	3,155	2,783	3	2.7	Agriculture, water, energy security, forestry, maritime and fisheries, health, public service, infrastructure, urban systems
Lao PDR	no data	no data	no data	no data	2.38	2.85	Agriculture, forestry, water resources, transport and urban development, public health
Malaysia	2,689	2,630	1,743	1,465	1.13	1.06	Water and coastal resources, agriculture and food, forestry and biodiversity, infrastructure, energy, public health
Myanmar	3,851	3,649	1,261	682	1.23	1.18	Agriculture, forestry, public health, water resources, coastal zone, biodiversity
Philippines	4,720	4,606	1,198	652	5.5	5.67	Agriculture and food, watersheds covering, forestry, biodiversity, water resources, coastal and marine resources, human health
Singapore	128	128	1,630	1,382	0.22	0.31	Water, transport and urban infrastructure, public health, food supply
Thailand	2,012	1,985	3,157	2,482	6.9	6.84	Water management, agriculture and food security, tourism, health, natural resource management, human settlement and security
Vietnam	37,810	37,720	6,482	8,621	7.82	7.85	Water resources, agriculture, transportation, urban development, tourism, public health

RCP 4.5=intermediate scenario for reductions in carbon emissions; RCP 8.5="business-as-usual" (high emissions) scenario.
Note: While other sectors may be impacted within countries, the table only lists those sectors identified by the respective countries.
Source: Compiled from ASEAN, *ASEAN State of Climate Change Report* (Jakarta: ASEAN Secretariat, 2021), tables 8 and 9.

Two countries in Southeast Asia are home to ports deemed to be among the top 50 in terms of having the largest exposure to climate-linked trade disruptions through port disruptions (within the country and in source countries). They are the Philippines (Manila and Batangas ports) and Vietnam (Thanh Ho Chih Minh). Southeast Asia is also at risk from the logistics-related vulnerabilities of its key trading partners in the top 50 list, among them Australia (Port Hedland), China (Shanghai, Kao Hsiung, Ningbo, for example), India (Vishakhapatnam), Japan (Nagoya, Yokohama, Kisarazu Ko) and South Korea (Pusan, Gwangyang Hang). The majority of these ports have been found to have exposure to three or more hazards, including coastal flooding, river flooding, pluvial flooding, cyclone wind and earthquakes.[49] The systemic nature of such climate-related risks is due to the multiple forward and backward trade linkages, whether for production inputs (backward linkages) or in getting trade output to consumers (forward linkages). Table 3.2 indicates the industry output among ASEAN countries at risk from such disruptions, which totals USD 8.1 billion in the case of forward linkages, USD 12.7 billion for backward linkages, and USD 2.1 billion in consumption.[50] These figures mean that climate concerns will be a critical consideration in future economic development strategies within the region.

Table 3.2 Industry output at risk from climate-related trade disruptions at ports in Southeast Asia (million USD)

Country	Industry output at risk: Forward linkages	Industry output at risk: Backward linkages	Consumption at risk
Brunei Darussalam	11.97	67.85	0.49
Indonesia	801.43	2173.5	260.45
Cambodia	34.26	72.95	19.68
Lao PDR	13.71	34.55	2.1
Myanmar	8.82	147.52	8.11
Malaysia	1,288.06	1,770.75	239.47
Philippines	899.83	1,334.28	223.45
Singapore	2,409.24	2,739.38	446.96
Thailand	2,010.66	2,612.97	484.86
Vietnam	656.98	1,779.3	465.6
ASEAN total	8,134.97	12,733.04	2,151.17

Source: Data compiled from analysis in Jasper Verschuur, Elco E. Koks, and Jim W. Hall, "Systemic Risks from Climate-related Disruptions at Ports," *Nature Climate Change* 13 (2023), https://doi.org/10.1038/s41558-023-01754-w

As shown, the available data reflect the impacts of specific climate threats on specific countries (Table 3.1) and country-level economy-wide impacts from supply chain impacts owing to international supply disruptions across all sectors (Table 3.2). There is however less on downscaled projections of the impacts of climate change, except for some modelling done for the food and agricultural sector. There needs to be more

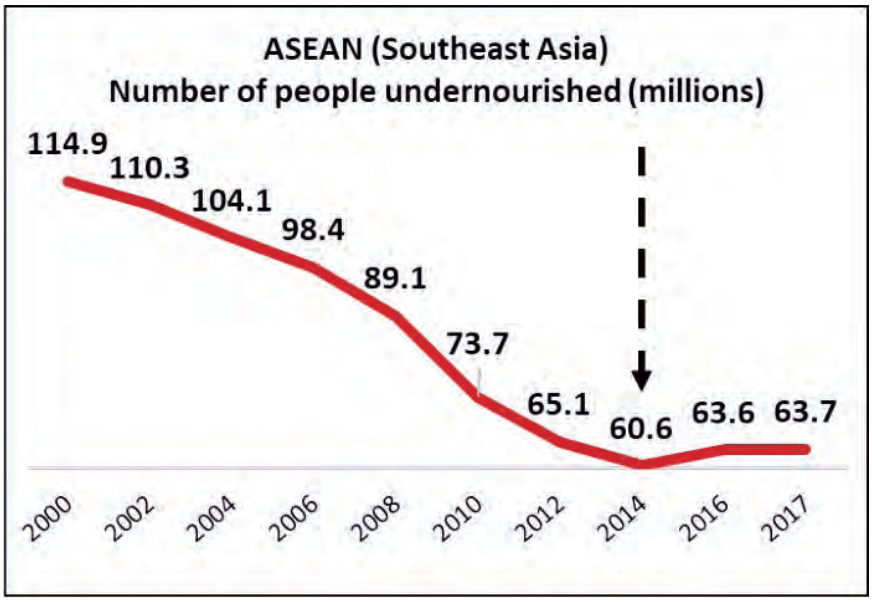
[49] Verschuur et al., "Systemic Risks," 805.
[50] Verschuur et al., "Systemic Risks," 805.

Research focused on providing comprehensive, downscaled data, particularly at the intersection of the country level and the sectoral level.

3.2 Climate change and food security

Over the past two decades, climate change has greatly impacted food security in Southeast Asia. It has led to a "U-turn" in undernourishment levels. Undernourishment in Southeast Asia had been on consistently falling between 2000 and 2014, but this reversed in 2014–2016 (Figure 3.1). This observation paralleled global trends, which the Food and Agriculture Organization of the United Nations (FAO) attributed to "persistent instability in conflict-ridden regions", "adverse climate events" and "economic, slowdowns" that "worsened the food security situation".[51] The broader interrelationship between climate change and food security is summarised in Figure 3.2.

Figure 3.1 U-turn in undernourishment in Southeast Asia



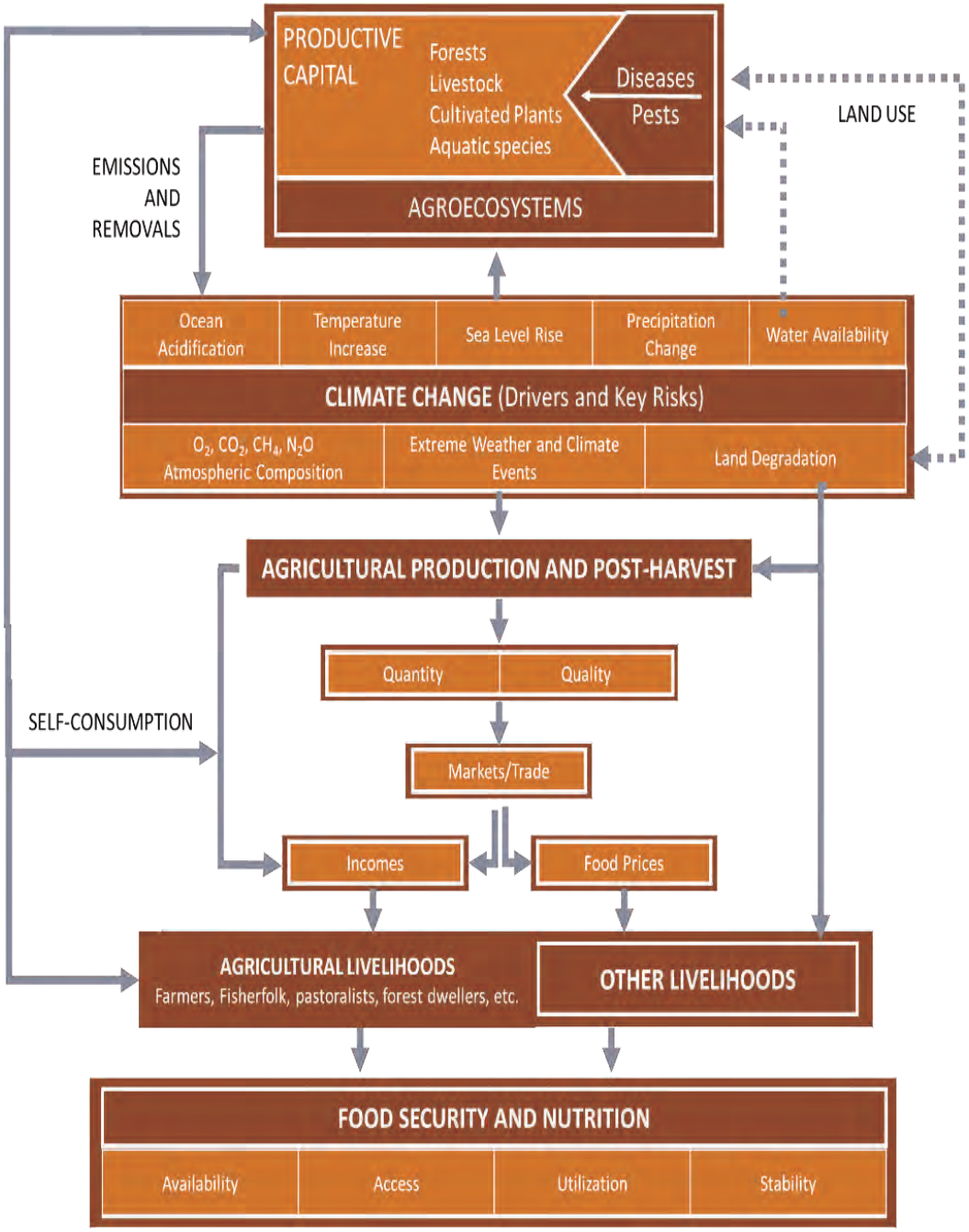
Source: Based on FAO data compiled in Jose Ma. Luis P. Montesclaros, Paul P.S. Teng, and Mely Caballero-Anthony, "Digital Technology Utilization in the Agriculture Sector for Enhancing Food Supply Chain Resilience in ASEAN: Current Status and Potential Solutions" (Singapore: S. Rajaratnam School of International Studies, June 2023). https://www.rsis.edu.sg/wp-content/uploads/2023/06/Project-Report-ASEAN-Digitalisation-Status-and-Solutions_RSIS_ERIA-June2023.pdf. Adapted with authors' permission.

Undernourishment is just one among the many ways of measuring hunger, and is measured at the macro level. A further measurement developed by the FAO relates to the experience of moderate and severe food insecurity, or the Food Insecurity Experience Scale (FIES), based on individual/household data. It is noteworthy that the

[51] Food and Agriculture Organization of the United Nations (FAO) et al., *The State of Food Security and Nutrition in the World 2018: Building Climate Resilience for Food Security and Nutrition* (Rome, FAO, 2018), 2.

FIES was only developed in the last decade, which prevents a direct comparison of hunger with prior decades.[52]

Figure 3.2 FAO framework for climate change and food security



Note: Source: Adapted from Jose Ma. Luis Montesclaros and Margareth Sembiring. "Food Insecurity Beyond Borders: Untangling the Complex Impacts of Ukraine War on Global Food Security," NTS Insight IN22-03, August 2022, https://www.rsis.edu.sg/wp-content/uploads/2022/08/NTS-Insight-IN-22-03-Food-Insecurity-Beyond-Borders-Aug2022.pdf; based on Food and Agriculture Organization of the United Nations (FAO) et al., *The State of Food Security and Nutrition in the World 2018: Building Climate Resilience for Food Security and Nutrition* (Rome: FAO, 2018).

[52] Jose Ma Luis Montesclaros,, "Changing the Narrative of ASEAN Progress in Addressing Hunger: 'Snoozing' the Alarm for SDG#2?" *Food Security* 13, no. 5 (2021).

Rice is among the most important food crops globally and in Asia, supporting the calorie needs of over 3.5 billion people worldwide. Heading up to 2050, rice production will need to be expanded by 35% to meet growing global demand, as noted during the 2023 International Rice Congress. Southeast Asia plays a significant role. Deemed the world's "rice bowl", more than 80% of the global rice trade is from the region.[53] Yet, owing to climate change, agricultural yields/productivity are expected to decline by 10% by 2050.[54] According to a 2018 study, 50% of rice cultivation in Southeast Asia would be impacted as a result of change in rainfall patterns triggered by climate change.[55]

Exposure to climate change-related hazards and population growth are also driving food insecurity. Within the Asia Pacific, including Southeast Asia, over 57 million people in 2021 have been affected by climate-related hazards such as floods, typhoons, drought and storms.[56] The population in Southeast Asia has also jumped, from 532.3 million (2001) to 648.6 million (2017), putting pressure on countries to sure sufficient availability of and access to food for its citizens.[57]

As a result of these factors, about 6.3% of the population in Southeast Asia was undernourished in 2021, representing 42.8 million people, and 20.7% faced moderate or severe food insecurity, representing 139.7 million people.[58] Climate change and natural hazards further heighten food insecurity due to their impact on food production and food prices and disruptions to food distribution.[59] Table 3.3 shows the extent of the areas damaged by multiple threats such as floods, droughts, pests, and diseases, compiled from ASEAN Food Security Information System (AFSIS).

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[53] Paul Teng and Jose Ma. Luis Montesclaros, "A Revolution in Rice Production?" RSIS Commentary, 24 October 2023, https://www.rsis.edu.sg/rsis-publication/nts/a-revolution-in-rice-production/
[54] Teng and Montesclaros, "A Revolution in Rice Production?"
[55] C.S.C. Sekhar, "Climate Change and Rice Economy in Asia: Implications for Trade Policy" (Rome: FAO, 2018).
[56] ASEAN, "Southeast Asian Countries Enhance Capacity to Anticipate Climate Related Hazards," 26 May 2022, https://asean.org/southeast-asian-countries-enhance-capacity-to-anticipate-climate-related-hazards/
[57] Neneng Ela Fauziyyah and Jarita Duasa, "Analysis of Food Security in Southeast Asia Countries," *IOP Conference Series: Earth and Environmental Science* 756, no. 012004 (2021), https://doi.org/10.1088/1755-1315/756/1/012004
[58] FAO and United Nations Children's Fund (UNICEF), "Asia and the Pacific – Regional Overview of Food Security and Nutrition 2021: Statistics and Trends" (Bangkok: FAO, 2021), https://doi.org/10.4060/cb7494en
[59] L.R.E. Malau, A.T. Darhyati, and Suharno, "The Impact of Climate Change and Natural Disasters on Food Security in Indonesia: Lessons Learned on Preserving Forests Sustainability," *IOP Conference Series: Earth and Environmental Science* 886, no. 012090 (2021), https://doi.org/10.1088/1755-1315/886/1/012090

Table 3.3 Area damaged (hectares) by hazards in Southeast Asia, for five priority crops, as of June 2023

	Flood	Drought	Pests	Diseases	Other	Unspecified	Total
Rice	502,278	4,787	28	29	1,620	0	508,742
Maize	6,210	18,443	-	-	-	-	24,653
Sugarcane	1,662	-	-	-	-	-	1,662
Soybean	31	12	-	-	-	-	43
Cassava	199,362	-	-	-	-	6,254	205,616
Total	709,543	23,242	28	29	1,620	6,254	

Note: Based on data from country reports to the ASEAN Food Security Information System (AFSIS). For information on country-level disruptions, refer to p. 6 (rice), p. 22 (maize), p. 38 (sugarcane), p. 55 (soybean) and p. 66 (cassava) of the source report.
Source: Compiled from ASEAN Food Security Information System (AFSIS), "ASEAN Agricultural Commodity Outlook No. 30" (Bangkok: AFSIS Secretariat, June 2023), https://www.aptfsis.org/uploads/normal/ACO%20Report%201/ACO%2030/15%20ACO%20No.%2030%20final%20version%20@23-08-2023.pdf

In 2019–2020, the Philippines, Cambodia, Indonesia, Lao PDR, Thailand, Timor Leste, Vietnam, Malaysia and Myanmar were faced with a serious drought emergency. The water level of the Mekong River dropped to 60-year record lows, and the situation was worsened by the El Niño phenomenon.[60] In Lao PDR, an estimated 67,800 people were food insecure from March 2020 due to the impacts of drought and flooding. Food insecurity was the most severe among poor households and those who depend on upland rice cultivation.[61]

In the Philippines, specifically Mindanao, climate change and conflict "significantly increases smallholder vulnerability, resulting in a loss of livelihoods, financial assets, agricultural yield, and the worsening of debt problems".[62] Vulnerability differs between men and women farmers: extreme climate events in conflict areas tend to disproportionately impact women as they "farm in smaller plots, work shorter hours or limit farming to cash crops".[63]

Social unrest could be triggered if safety nets are not strategically deployed to mitigate the impact of climate change-induced events on the agricultural sector. This was seen in the Philippines when the drought in 2016 affected about 300,000ha of farmland, resulting in losses of 5.3 billion pesos in rice and corn.[64] Farmers saw their livelihoods disappear. This led about 6,000 rice farmers in North Cotabato, Mindanao to engage

[60] Hen-I Lin et al., "Status of Food Security in East and Southeast Asia and Challenges of Climate Change," *Climate* 10, no. 3 (2022), https://doi.org/10.3390/cli10030040
[61] FAO, "Special Report – 2019 FAO/WFP Crop and Food Security Assessment Mission to the Lao People's Democratic Republic" (Rome: FAO, 2020), https://doi.org/10.4060/ca8392en
[62] Alvin Chandra et al., "Gendered Vulnerabilities of Smallholder Farmers to Climate Change in Conflict-prone Areas: A Case Study from Mindanao, Philippines," *Journal of Rural Studies* 50 (2017), https://doi.org/10.1016/j.jrurstud.2016.12.011
[63] Chandra et al., "Gendered Vulnerabilities of Smallholder Farmers."
[64] "Philippine Rice Farmer Killed as Drought Protest Turns Violent: Demo Leader," *Reuters*, 1 April 2016. https://www.reuters.com/article/us-philippines-farmers-idUSKCN0WY3SV

in protest. When the protests turned violent, the police opened fire, killing one and wounding about a dozen.

Food insecurity could also exacerbate existing internal instabilities, as in Songkhla province in the south of Thailand, where the BRN-C (Barisan Revolusi Nasional-Coordinate), an insurgent group, raided rice fields during a period of intense drought in 2004.[65] And, according to a 2005 report the Thai Ministry of Interior, the number of villagers killed by insurgents increased by 90%.[66]

Indeed, the growing impact of climate change has had an amplifier effect on food security in areas of conflict that are also disaster-prone, such as Myanmar's Rakhine State, particularly given that livelihoods in these areas are traditionally linked to agriculture. Critically, the FAO estimates that "80% of the Rakhine population is under nourished or suffer malnutrition with three-quarters living below the poverty line".[67] In 2023, the FAO reports that food insecurity has heightened due to an intensification of conflict, reduced agricultural production in 2022, skyrocketing food prices, and the impact of Cyclone Mocha that hit Myanmar in 2023.[68]

Beyond the direct impacts on crop production and livelihoods, climate change can further precipitate conflict within the fisheries sectors, owing to the increasing scarcity of resources and the impacts of overfishing practices, as will be noted in the section on IUU fishing in the South China Sea (section 5.2).

3.2.1 ASEAN initiatives to combat food insecurity

Regionally, food security has been a key agenda in ASEAN cooperation. In response to the rise of international food prices in 2007–2008, ASEAN strengthened its existing measures to address food security problems. Discussions were initiated on long-term strategies, during which the ASEAN Integrated Food Security (AIFS) Framework was developed. The Strategic Plan of Action on Food Security for the ASEAN Region (SPA-FS), a work plan to support the AIFS, was also introduced. The plan was rolled out with actionable initiatives, including the launch of the ASEAN Plus Three Emergency Rice Reserve (APTERR) Agreement; planning for an ASEAN Food Security Information System (AFSIS); and strengthening of cooperation with international organisations like the FAO and ADB.[69] However, there were challenges to a unified approach in Southeast Asia in responding to the 2007–2008 food crisis,

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[65] Darren Cheong, "Examining Climate–Conflict Links in Southeast Asia," ISEAS Perspective 2022/15, 21 February 2022, https://www.iseas.edu.sg/wp-content/uploads/2022/01/ISEAS_Perspective_2022_15.pdf
[66] Cheong, "Examining Climate-Conflict Links in Southeast Asia."
[67] Cited in Xiaodong Huang, Beth Ziniti, and Nathan Torbick, "Assessing Conflict Driven Food Security in Rakhine, Myanmar with Multisource Imagery," *Land* 8, no. 6 (2019), https://doi.org/10.3390/land8060095
[68] FAO, "GIEWS Update: The Republic of the Union of Myanmar – The Current Critical Food Insecurity Situation Could Deteriorate in the Second Half of 2023 – Myanmar," 31 July 2023, https://www.fao.org/3/cc7195en/cc7195en.pdf
[69] Md Saidul Islam and Edson Kieu, "Climate Change and Food Security in ASEAN," in *Climate Change and Food Security in Asia Pacific: Response and Resilience* (Cham: Palgrave McMillan, 2021), 55–59.

as rice-importing countries such as Malaysia and the Philippines opted to supply global food demand and to enforce restrictions from rice-producing countries in the region, thereby undermining regional cooperation.[70]

Within the region, climate change is addressed through climate-smart agriculture as well as other technologies and practices that build resilience.[71] The COVID-19 pandemic accelerated the digitalisation of food production and other aspects of the supply chain. These initiatives include guidelines for digital agriculture, "smart farming" with digital tools such as laser-guided tractors and satellite information, and precision farming.[72] Moving forward, ASEAN should continue to explore greater adoption of digital technologies in food production. These technologies can help "improve the agricultural productivity of farmers, through early warning information and guidance on practices to implement in the face of climate change".[73]

Agro-ecology approaches could also be pursued, as reflected in the ASEAN Regional Guidelines for Sustainable Agriculture, which advances the integrated goals of environmental integrity, economic resilience, social well-being, good governance, food security, and poverty alleviation.[74] The ASEAN Community Based Tourism Standard considers the importance of agri-tourism, which could contribute to natural resource conservation.[75]

There is also room for improvement in how affected Southeast Asian countries address food insecurity in conflict areas. In Southeast Asia, more attention should be directed to the impacts of malnutrition and food security on populations in rural areas, where the livelihoods of smallholder farmers are particularly vulnerable to climate-related hazards and conflict. To effectively address issues of food insecurity and climate change in conflict hot spots, ASEAN will have to re-think its approach, with more concerted efforts to address the human security issues of vulnerable populations such as women, farmers and displaced persons.

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[70] Tamara Nair, "Climate Change and Food Insecurities: Destabilisers of ASEAN Centrality?" in *International Security in the Asia-Pacific: Transcending ASEAN towards Transitional Polycentrism*, ed. Alan Chong (Palgrave Macmillan, 2018).
[71] Islam and Kieu, "Climate Change and Food Security," 55–59.
[72] Paul Teng, Mely Caballero-Anthony, and Jose Ma. Luis P. Montesclaros, "ASEAN Responses to COVID-19 for Assuring Food Security," in *Advances in Food Security and Sustainability*, ed. Marc J. Cohen (Elsevier, 2021), 111.
[73] Jose Ma. Luis Montesclaros, "Has Southeast Asia Reached a New Normal in Food Security? Dissecting the Impacts of COVID-19 as a Hybrid Health–Economic Crisis," in *Non-Traditional Security Concerns in the New Normal*, ed. Mely Caballero-Anthony and Jose Ma. Luis Montesclaros (Singapore: S. Rajaratnam School of International Studies, 2022), 23.
[74] ASEAN, "ASEAN Regional Guidelines for Sustainable Agriculture" (Jakarta: ASEAN Secretariat, 2022), https://asean.org/wp-content/uploads/2022/10/2023_App-1.-ASEAN-Regional-Guidelines-for-Sustainable-Agriculture_adopted.pdf
[75] Montesclaros, "Has Southeast Asia Reached a New Normal," 23.

3.3 Climate change and health security

The World Health Organization (WHO) has warned that climate change is the "biggest global health threat of the 21st century".[76] The analyses in this report of the various peace and security challenges affected by climate change reveal that health security is a significant area of impact for Southeast Asia. This section offers a broad overview of how climate change can undermine health security.

As global temperatures rise, more people are at risk of increased mortality during periods of extreme heat exposure. In April to May 2023, a heat wave swept across Asia and Southeast Asia, with record high temperatures seen in Bangladesh, India, Lao PDR, Thailand and Vietnam. Thailand reported casualties amid rising temperatures over several days.[77]

The IPCC Fifth Assessment Report has highlighted that extreme climate would also have an impact on human health; for example, heavy rainfall and temperature could increase the risk of fever and malaria.[78] Other studies have projected that climate change would lead to an increase in and new exposures to Aedes-borne viruses, in particular, dengue, chikungunya and Zika. A 2002 study estimates that the population at risk from dengue would rise from 1.5 billion in 1990 to 5–6 billion by 2085 due to climate change.[79] The spread of infectious diseases could be further amplified through climate change and natural disasters, increasing the vulnerability and exposure of communities to "contaminated drinking water, vectors or pathogens". [80]

Climate change is already having a visible impact on the spread of human pathogenic disease. One study has found that about 58% of infectious diseases globally had been aggravated by climate hazards. The study identifies some 1,000 unique pathways in which climate hazards could lead to pathogenic diseases.[81] Southeast Asia has already faced several outbreaks of infectious diseases, with severe impacts on public health systems and national economies. The 2003 severe acute respiratory syndrome (SARS) outbreak was significant as it highlighted the transboundary impact of an infectious disease emanating from one country and spreading regionally and globally. Southeast Asia also confronted health crises brought on by influenza outbreaks such

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[76] World Health Organization (WHO), "WHO Calls for Urgent Action to Protect Health from Climate Change – Sign the Call," 6 October 2015, https://www.who.int/news/item/06-10-2015-who-calls-for-urgent-action-to-protect-health-from-climate-change-sign-the-call#:~:text=The%20evidence%20is%20overwhelming%3A%20climate,decisively%20to%20change%20this%20trajectory.&text=Climate%20change%20is%20the%20greatest,to%20current%20and%20future%20generations

[77] Tommy Walker, "Thailand's Extreme Heat Predicted to Continue into Summer," *VOA News*, 25 April 2023, https://www.voanews.com/a/thailand-s-extreme-heat-predicted-to-continue-into-summer/7065268.html

[78] Rais Akhtar, ed., *Climate Change and Human Health Scenario in South and Southeast Asia* (Cham: Springer, 2016).

[79] Simon Hales et al., "Potential Effect of Population and Climate Changes on Global Distribution of Dengue Fever: An Empirical Model," *Lancet* 360, no. 9336 (2002), https://doi.org/10.1016/S0140-6736(02)09964-6

[80] Jan C. Semenza, Joacim Rocklöv, and Kristie L. Ebi, "Climate Change and Cascading Risks from Infectious Disease," *Infectious Diseases and Therapy* 11, no. 4 (2022), https://doi.org/10.1007/s40121-022-00647-3

[81] Camilo Mora et al., "Over Half of Known Human Pathogenic Diseases Can Be Aggravated by Climate Change," *Nature Climate Change* 12, no. 9 (2022), https://doi.org/10.1038/s41558-022-01426-1

as H5N1, H1N1 and H7N9. In 2020, the health systems of ASEAN countries once again faced significant pressure with the emergence of COVID-19.

Climate change can further compound and exacerbate healthcare vulnerabilities, particularly in areas of conflict. Scholars argue that conflict creates the conditions in which populations are more susceptible to infectious diseases, due to decreased access to clean water, sanitation and shelter.[82] In conflict situations, healthcare infrastructure and systems may be destroyed, or they may have a higher load of trauma care patients, which could limit their ability to respond effectively. While the academic literature examining the links between climate change, conflict and health is relatively sparse, particularly in Southeast Asia, this subject matter has increasingly featured in work by political and social scientists.[83]

Climate change and conflict can also have an impact on mental health. One study examining the effects of the insurgency in three southern provinces in Thailand (Pattani, Yala and Narathiwat) has found that migration and the economic effects from the unrest were associated with the reporting of more psychiatric symptoms among adults living there.[84] These areas are also exposed to climate change events, such as extreme drought, that can give rise to increased stress, anxiety and malnutrition.[85] The nexus of climate change and conflict in such areas would likely exacerbate the detrimental impacts on the health and the well-being of the communities living there.

3.3.1 State of health security in ASEAN

A comparison of factors such as population density, life expectancy and population ageing in Southeast Asia shows diversity in the region's populations and health systems.[86] Death from communicable diseases remains marked in Cambodia, Lao PDR and Myanmar, while in Singapore, there has been a stark reduction in infectious diseases such as tuberculosis since 1963. At the same time, countries such as Singapore and Thailand face a rapidly ageing population, with the percentage of the elderly projected to double due to fertility reduction.[87]

The phenomenon of ageing populations in several countries within Southeast Asia raises the stakes on climate change impacts. Older persons are likely to be disproportionately affected by extreme heat and heightened risks of heart disease,

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[82] Devin C. Bowles, Colin D. Butler, and Neil Morisetti, "Climate Change, Conflict and Health," *Journal of the Royal Society of Medicine* 108, no. 10 (2015), https://doi.org/10.1177/0141076815603234
[83] Bowles, "Climate Change, Conflict and Health."
[84] Kathleen Ford, Aree Jampaklay, and Aphichat Chamratrithirong, "Mental Health in a Conflict Area: Migration, Economic Stress and Religiosity in the Three Southernmost Provinces of Thailand," *International Journal of Social Psychiatry* 63, no. 2 (2017), https://doi.org/10.1177/0020764016685119
[85] UNICEF, "UNICEF Report Finds Children in Thailand at 'High Risk' from Climate Change and Environmental Degradation," 28 March 2023, https://www.unicef.org/thailand/press-releases/unicef-report-finds-children-thailand-high-risk-climate-change-and-environmental
[86] Virasakdi Chongsuvivatwong et al., "Health and Health-care Systems in Southeast Asia: Diversity and Transitions," *Lancet* 377, no. 9763 (2011), https://doi.org/10.1016/S0140-6736(10)61507-3
[87] Chongsuvivatwong et al., "Health and Health-care Systems," 431.

stroke and acute lower respiratory disease.[88] In addition to the physical health impacts, the mental health of various segments of the population could also be affected during periods of natural disasters, heat waves and possible displacement due to climate change.

The countries of Southeast Asia already face a number of health security challenges, from weak health systems to lack of medical personnel, and issues of cost of medical care and access to healthcare. These vulnerabilities could be compounded by the effects of climate change, and this could widen existing disparities seen in healthcare and health systems across the region. An example is the maternal mortality rate (MMR), which is higher in Indonesia and the Philippines compared to other countries in the region. In 2017, the MMR in Indonesia was 177 deaths per 100,000 live births, while in the Philippines, it was 121 deaths per 100,000 live births.[89] Comparatively, the MMR in Singapore, Malaysia, Brunei, Thailand and Vietnam were at 8; 29; 31; 37 and 43 per 100,000 live births. Indirect causes of maternal death include inadequate human resources, insufficient antenatal care and delays in seeking treatment.[90] Another study, which examined health equity with reference to migrants in the Greater Mekong Sub-region, has found that those in the border areas have a higher risk of malaria infection as they are more exposed to vector-borne diseases and are under-served by health services.[91]

3.3.2 ASEAN frameworks for health security

The 2003 SARS outbreak was significant as there was a "securitisation" of health, and it triggered cooperation among ASEAN states due to the transboundary nature of the disease. ASEAN leaders convened a Health Summit together with China, Japan and South Korea to coordinate their efforts to manage the "spread of the disease" and address "issues such as border controls and immigration".[92] From 2003 to 2009, regional health security efforts were bolstered to respond to influenza outbreaks such as H5N1, H1N1 and H7N9.

In 2020, the health systems of ASEAN countries again came under significant pressure with the emergence of COVID-19. Regular meetings were held by ASEAN health experts and leaders to exchange critical information on COVID-19-related measures.[93] The COVID-19 outbreak revealed the importance of preventive measures

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[88] Akhtar, *Climate Change and Human Health Scenario*.
[89] Ratna Dwi Wulandari, Agung Dwi Laksono, and Nikmatur Rohmah, "Urban–Rural Disparities of Antenatal Care in South East Asia: A Case Study in the Philippines and Indonesia," *BMC Public Health* 21, no. 1221 (2021), https://doi.org/10.1186/s12889-021-11318-2
[90] Wulandari et al., "Urban–Rural Disparities of Antenatal Care."
[91] Celia McMichael and Judith Healy, "Health Equity and Migrants in the Greater Mekong Subregion," *Global Health Action* 10, no. 1 (2017), https://doi.org/10.1080/16549716.2017.1271594
[92] Mely Caballero-Anthony, "SARS in Asia: Crisis, Vulnerabilities, and Regional Responses," *Asian Survey* 45, no. 3 (2005); Melissa Curley and Nicholas Thomas, "Human Security and Public Health in Southeast Asia: The SARS Outbreak," *Australian Journal of International Affairs* 58, no. 1 (2004).
[93] L.Y. Arnakim, and T.M. Kibtiah, "Response of ASEAN Member States to the Spread of COVID-19 in Southeast Asia," *IOP Conference Series: Earth and Environmental Science* 729, no. 012100 (2021).

and a concerted effort in the containment and treatment of the virus for the population and for impacted vulnerable communities.

In response to the COVID-19 pandemic, several regional public health initiatives that were previously developed during SARS were activated. They include the ASEAN Emergency Operations Centre Network for Public Health, the ASEAN Plus Three Field Epidemiology Training Network and the ASEAN BioDiaspora Regional Virtual Centre (ABRVC).

Beyond pandemic response, ASEAN has also adopted a broader approach to regional health efforts that focuses on holistic wellness, management of non-communicable diseases, strengthening of access to healthcare, and food safety.[94] Other areas of cooperation include preventing and addressing emerging viruses such as Zika and Ebola and tackling anti-microbial resistance (AMR). In relation to climate change, and environmental concerns, ASEAN has also cooperated in developing initiatives to combat air pollution caused by transboundary haze. Seasonal haze episodes in the region due to slash-and-burn techniques have a negative impact on air quality and public health. A collective mitigation measure that was ratified was the ASEAN Agreement on Transboundary Haze Pollution (AATHP), with Indonesia being the last ASEAN member state to sign the treaty in 2015. Scholars have pointed out that while ASEAN states have taken steps to address the issue, haze pollution continues to be an issue.[95] The increased number of hot spots in Kalimantan and Sumatra in the latter half of 2023 has raised concerns about the return of transboundary haze . Peatland and forest fires have been worsened by the dry season and exacerbated by the return of El Niño.[96]

In the context of humanitarian aid, ASEAN has also cooperated to develop disaster health management mechanisms. The Project for Strengthening the ASEAN Regional Capacity on Disaster Health Management (ARCH Project) has been instrumental in developing a standard operating procedure for the coordination of International Emergency Medical Teams (I-EMTs), regional tools as well as the establishment of the Regional Coordination Committee on Disaster Health Management (RCCDHM).[97] Enhancing regional capabilities and capacity to address the burden of disasters and public health emergencies is vital in crisis situations when a country's healthcare system is limited. One key initiative was the development of regional forms such as

[94] Mely Caballero-Anthony, "Health and Human Security Challenges in Asia: New Agendas for Strengthening Regional Health Governance," *Australian Journal of International Affairs* 72, no. 6 (2018).
[95] Sia Dewei Alvin, "Effectiveness of the ASEAN Agreement on Transboundary Haze Pollution," *Environmental Law Review* 24, no. 4 (2022).
[96] "Haze Blankets Cities in Indonesia's Kalimantan and Sumatra as Fires Rage," *The Star Online*, 9 September 2023, https://www.thestar.com.my/aseanplus/aseanplus-news/2023/09/09/haze-blankets-cities-in-indonesias-kalimantan-and-sumatra-as-fires-rage
[97] Phumin Silapunt et al., "How the ARCH Project Has Contributed to the Development of the ASEAN Regional Collaboration Mechanism on Disaster Health Management," *Prehospital and Disaster Medicine* 37, no. S1 (2022), https://doi.org/10.1017/S1049023X2200005X

medical records for use during emergencies and disasters, to help healthcare professionals manage health information during disaster relief.[98]

3.3.3 Health and climate security challenges ahead

For a long time, ASEAN's health initiatives were made largely in response to infectious disease outbreaks. In ASEAN's earlier regional frameworks on health cooperation, climate change was notably absent.[99] However, in May 2023, progress was made as ASEAN leaders committed to establishing the ASEAN One Health Network. They also articulated that the One Health High-Level Expert Panel (OHHLEP) and One Health Joint Plan of Action (2022–2026) would "enhance their ability to optimise the health of humans, animals, plants, and ecosystems as well as the capacity to prevent, predict, detect, and respond to health threats".[100] The declaration also specifically highlighted climate change as a factor that has exacerbated health threats. It further outlines a commitment to address "priority health threats to human, animals, plant and environment including zoonotic pathogens that caused outbreaks and those with pandemic potential, to guide investment, research, and development for prevention, preparedness and response (PPR) activities."[101]

A key area of focus under ASEAN's One Health initiative is zoonotic transmission. Research has found that climate change increases the risk of cross-species transmission; a 2022 study demonstrates that the majority of viral transmission across species occur in Southeast Asia, with a large proportion traced to bats.[102] Some of ASEAN's efforts in this area include the 2021 ASEAN Strategy for Exotic, Emerging, Re-emerging Diseases and Animal Health Emergencies, a framework that aims to prevent the spread of zoonotic diseases through early detection and response within the animal health system.[103] The 2022 ASEAN Strategy for Preventing Transmission of Zoonotic Diseases from Wildlife Trade further addresses the issue as a comprehensive approach, which includes the strengthening of mechanisms within the One Health approach in relation to wildlife trade, and bolstering the enforcement and harmonisation of wildlife trade laws.[104]

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[98] Silapunt et al., "How the ARCH Project Has Contributed."
[99] Caballero-Anthony, "Health and Human Security Challenges in Asia."
[100] Katriana, "ASEAN Leaders Commit to Establishing One Health Network," *Antara News*, 10 May 2023, https://en.antaranews.com/news/281214/asean-leaders-commit-to-establishing-one-health-network
[101] ASEAN, "ASEAN Leaders' Declaration on One Health Initiative," adopted 10 May 2023, https://asean.org/wp-content/uploads/2023/05/11-ASEAN-One-Health-Initiative-Declaration_adopted.pdf
[102] Colin J. Carlson et al., "Climate Change Increases Cross-species Viral Transmission Risk," *Nature* 607, no. 7919 (2022), https://doi.org/10.1038/s41586-022-04788-w
[103] ASEAN, "ASEAN Strategy for Exotic, Emerging, Re-emerging Diseases and Animal Emergencies," 2021, https://asean.org/wp-content/uploads/2021/12/FAFD-35.-ASEAN-Strategy-Exotic-Emerging-Diseases-and-Animal-Health-Emergencies.pdf
[104] ASEAN, "ASEAN Strategy for Preventing Transmission of Zoonotic Diseases from Wildlife Trade," 2022, https://asean.org/wp-content/uploads/2023/01/15.-ASEAN-Strategy-for-Preventing-Zoonotic-Diseases-Transmission-from-Wildlife-Adopted.pdf

While it remains to be seen how these declarations would translate into further action and collaboration between ASEAN states, any development would be built from previous concerted efforts in addressing health security. On an institutional level, this could mean integrating environmental and regional health initiatives, where efforts would include wider considerations of the environmental impact on health, as well as focusing on mitigation of climate change, and ensuring that ecosystems are protected from pollution and other threats.

ASEAN countries should also continue to advance their efforts, both nationally and regionally, to promote universal health coverage (UHC) so that all segments would have access to healthcare facilities and resources, and to bolster healthcare systems so that they would be resilient to future pandemics, climate-related crises, and the wave of ageing and chronic diseases.

3.4 Climate change and water security

Soaring temperatures and volatile weather conditions are putting more pressure on dwindling water supplies across most of Southeast Asia. Long-term forecasts predict more severe drought in the future. Drought worsens water scarcity because it contributes to draining water sources needed for irrigation, hydropower generation and household water consumption.

Over the past three decades, roughly 66 million people in Southeast Asia have been affected by droughts and water shortages.[105] While they might start slowly, droughts often have intensifying effects on agrarian communities, undermining their food security and diminishing their incomes. Given that a large percentage of people in the region rely on agricultural production for their livelihoods, this has implications on livelihoods and economic growth. The extent and effects of water insecurity become more visible during disasters because water insecurity often highlights existing inequalities in society. Water tends to be distributed unevenly in the developing areas of Southeast Asia, and is still a commodity that many cannot always afford.[106] The inequitable allocation and access of water results to chronic stunting of health and productivity among socio-economically disadvantaged people.[107]

It is also important to explore potential climate, peace and security risks emanating from water insecurity issues. Water scarcity can contribute to geo-political stress in the regional and international arena. This might heighten the risk of “water wars” and escalate transboundary conflicts over control of water sources. While Southeast Asia

[105] United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and ASEAN, “Ready for the Dry Years: Building Resilience to Drought in South-East Asia” (Bangkok: UN, 2020), https://www.unescap.org/sites/default/files/publications/Ready%20for%20the%20Dry%20Years.pdf
[106] Poh Onn Lee, ed., *Water Issues in Southeast Asia: Present Trends and Future Directions* (Singapore: ISEAS, 2013).
[107] ASEAN–ROK Cooperation Fund, Chuncheon Global Water Forum, and Korea Institute of Civil Engineering and Building Technology, “Building Resilience for Sustainable ASEAN from Water-related Disasters” (Jakarta: ASEAN Secretariat, 2017).

has yet to face water wars, or communal conflicts and transboundary conflicts over water, it remains important to identify possible sources of tensions related to water insecurity in the region and the relevant human security implications, including the developments along the Mekong River and issues of access to clean water.

3.4.1 The case of the Mekong River's hydropower dams

The Mekong River has become an increasingly important source of clean energy (hydropower) in Southeast Asia. But climate change is now a threat to the health of the river system, which brings about human security consequences for communities relying on the river.

According to research by the Mekong River Commission (MRC), a wide range of changes would occur over the next 20 to 50 years. Temperatures are projected to increase across the basin and across seasons. By 2060, the average annual basin-wide increase could be between 0.4˚C and 3.3˚C depending on the trajectory of global greenhouse gas emissions. Average rainfall under a dry climate scenario is projected to decrease by 16% by 2060, and under a wet climate scenario, to increase by 17%.[108]

Climate change has significant implications for hydropower development in the Mekong basin. Reduced water flow downstream is a threat to hydropower dams built across the river. Agricultural yields and clean water supply are likely to be reduced. Hydropower production will be at risk due to increased drought.

The study by the MRC recognises the unevenness of the consequences of climate change. Some people and communities are more exposed than others or will have to deal with the impacts sooner or to a greater extent. Also, the impacts are not constrained by national boundaries. Upstream impacts can have implications downstream, and vice versa, and adaptation options, such as building dams, implemented by one country may pose direct or significant cross-border implications for other countries.[109]

In the Upper Mekong River Basin, massive hydropower development has been adopted as part of China's development strategy. China has already built 11 hydropower dams, two of which are mega storage dams. Another 11 dams, each with production capacity of over 100MW, are being planned or constructed. In the Lower Mekong Basin – Cambodia, Lao PDR, Thailand and Vietnam – the number of hydropower projects is 89 with 12,285MW total installed capacity. Of these, two are in Cambodia (401MW installed capacity), 65 in Lao PDR (8,033MW), 7 in Thailand (1,245MW) and 14 in Viet Nam (2,607MW). According to the MRC, hydropower

[108] Mekong River Commission (MRC), "Basin-wide Assessment of Climate Change Impacts on Hydropower Production" (Vientiane: MRC, 2019).
[109] MRC, "Climate Change," accessed 27 October 2023, https://www.mrcmekong.org/our-work/topics/climate-change/

development in the Lower Mekong Basin brings both positive and negative consequences.[110]

Hydropower dams provide a significant portion of the clean energy supply in Southeast Asia. The Lao PDR–Thailand–Malaysia–Singapore Power Integration Project (LTMS-PIP) currently delivers up to 100MW of renewable hydropower using existing cross-border power trade grid interconnections.[111] Thailand increased its hydropower imports from Lao PDR, from 9,000MW to 10,500MW in 2022, in response to rising energy demand, and its national commitment to reach carbon neutrality by 2050 and net-zero greenhouse gas emissions by or before 2065.[112]

Dam projects in the Mekong River have generated concerns and potential tensions between upstream and downstream states. Adverse effects, particularly in downstream countries, include fish stock depletion, negative changes in river hydrology, and sediment flux.[113] With the Lower Mekong Basin frequently experiencing drought and heat waves in recent decades, downstream dams will face the bleak future scenario of reduction in average hydropower production. Climate change contributes to upstream–downstream tensions as the flows downstream are heavily dependent on releases from upstream storage especially in the dry season. The dams upstream in China have far greater storage than the proposed downstream dams in the Lower Mekong Basin.[114] It is important to monitor possible transboundary tensions given the uneven impact of climate change on the capacity of upstream dams and downstream dams, especially in terms of water storage and electricity generation. Current geo-political dynamics in the Mekong Sub-region is further discussed in section 5.1.

Mega dam projects also lead to the relocation and displacement of many villages, affecting in particular ethnic groups who have lived along the banks of the Mekong for generations (see Table 3.4). As thousands of ethnic minorities and local communities were displaced, many of them have claimed that they were not consulted.[115]

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[110] MRC, "Hydropower," accessed 30 October 2023, https://www.mrcmekong.org/our-work/topics/hydropower/
[111] ASEAN, "Fourth Joint Statement of Lao PDR–Thailand–Malaysia–Singapore Power Integration Project," 24 August 2023.
[112] Phayboune Thanabouasy, "Thailand to Purchase for More Electricity from Laos This Year," *The Laotian Times,* 11 March 2022, https://laotiantimes.com/2022/03/11/thailand-to-purchase-for-more-electricity-from-laos-this-year/
[113] Akarath Soukhaphon, Ian G. Baird, and Zeb S. Hogan, "The Impacts of Hydropower Dams in the Mekong River Basin: A Review," *Water* 13, no. 3 (2021), https://doi.org/10.3390/w13030265
[114] MRC, "Basin-wide Assessment of Climate Change."
[115] Rasmeykanyka Bin and Ponleu Soun, "Reassessing the Impact of Hydropower Development Project along the Mekong River Basin in Cambodia," in *The Displaced: Disrupted Trade, Labour and Politics in the Mekong River Basin*, ed. Brahma Chellaney and Frederick Kliem (Tokyo: Konrad-Adenauer-Stiftung Japan Office, 2021), 126–143; Human Rights Watch, "Underwater: Human Rights Impacts of a China Belt and Road Project in Cambodia," 10 August 2021, https://www.hrw.org/report/2021/08/10/underwater/human-rights-impacts-china-belt-and-road-project-cambodia; Brian Eyler, "Science Shows Chinese Dams Are Devastating the Mekong," *Foreign Policy,* 22 April 2020, https://foreignpolicy.com/2020/04/22/science-shows-chinese-dams-devastating-mekong-river/

From the perspective of the ethnic minorities affected, their right to free, prior and informed consent had not been upheld. Their collective concern over the destruction of their livelihoods and cultural lands, and the effects on their source of their food security forest resources had not been fully considered by the dam proponents.[116] The combined impact of dam construction and climate change incurs potential costs. The decline of fisheries could cost nearly USD 23 billion by 2040. The loss of forests, wetlands and mangroves may cost up to USD 145 billion, according to the MRC.[117] These impacts highlight the need for risk mitigation strategies and consultations at the community level.

Table 3.4 Displacement due to dam projects in the Lower Mekong Basin

Selected dam projects	Displaced population
Lower Sesan 2 dam	5,000
Luang Prabang dam	10,000
Pak Beng Dam	6,700
Xayaburi dam	2,100
Xe Pian-Xe Namnoy hydropower	7,000

Source: Chai Chin Neo and Lee Li Wan, "The Cost of Laos' Quest to be Southeast Asia's 'Battery,' and the World Heritage Town," *CNA,* 30 October 2022, https://www.channelnewsasia.com/cna-insider/cost-laos-hydropower-quest-southeast-asia-battery-electricity-dams-risk-3029086

3.4.2 Challenges to access to clean water

Climate change is predicted to increase the intensity and duration of droughts as well as the frequency of extreme floods. Drought reduces agricultural production and constrains dry season cultivation. Also, when there is lower water flow in the Mekong River, the Mekong Delta experiences salt intrusion in the dry season from the sea, which again affects agricultural production.

With changing rainfall patterns, frequent floods are also an issue. Every year, floods affect large areas of the Lower Mekong Basin, with significant impacts on agricultural production as well as to lives and property. Floods sometimes damage irrigation reservoirs, weirs, canals and gates, which have low resilience due to poor quality of construction or maintenance, delaying agricultural production. Massive flooding destroys farms due to the low capacity of the drainage system.[118]

The growing intensity and variability of climate change-induced cyclones/typhoons, floods, storms, storm surges and drought should be a concern for Southeast Asia because it further exposes populations already at risk, even those not previously affected, to water security issues. Recent studies warn that up to 96% of the ASEAN

[116] Eyler, "Science Shows"; Human Rights Watch, "Underwater."
[117] MRC, "Hydropower."
[118] MRC, "Guidance for Improving Irrigation Systems to Address Climate Change and Food Security" (Vientiane: MRC Secretariat, 2022).

region is likely to be affected by drought, and up to 64% extreme drought.[119] This will bring about complex challenges related to access to clean water for agriculture and domestic consumption.

The work and livelihoods as well as properties and assets of communities are increasingly in danger from water insecurity and water-related disasters. The Philippines, for instance, is among the most vulnerable to climate-induced water insecurity such as drought and flooding, which can undermine the quality and quantity of freshwater resources and affect overall long-term security.[120] Strong typhoons that hit several parts of the country in recent years had caused prolonged water shortages. Damage to water-related infrastructure if they have been made climate-resilient could compound the problem as that could impede the delivery of much-needed clean water to affected communities. Conflict zones can also be doubly impacted by climate-induced events given the lack of effective water governance and infrastructure. In conflict-hit Marawi City in the southern Philippines, there were cases of internally displaced persons (IDPs) suffering from water shortages in their camps in the aftermath of typhoons.[121]

Water insecurity also arises as sea levels rise. Coastlines in the region have already started retreating, and several densely populated cities will be submerged at high tide by 2050. Millions living in megacities like Jakarta and Manila face multiple water-related risks like flooding and water pollution. Indonesia will have to deal with worsening water stress concerns with its extensive coastline and millions of people living in low-lying land just above sea level. Jakarta for example lies below sea level and is prone to increased flooding and sinking, prompting plans to move the capital to Kalimantan.[122] Ho Chi Minh City in Vietnam's Mekong Delta region consistently confronts flooding from rainfall and upstream discharges from Mekong dams.[123]

Climate-induced disasters, such as strong typhoons, could worsen water pollution. The disasters could damage ecosystems that serve as protective buffers and water filters, and they could also act as a medium for the spread of contaminants that can cause disease outbreaks. In Southeast Asia, it has been found that flooding could increase the transmission of cholera, dengue, hepatitis A, leptospirosis, and malaria.[124] The added burden of extreme weather events brought about by climate

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[119] ESCAP and ASEAN, "Ready for the Dry Years."
[120] James Giles et al., "Climate-resilient Agriculture in the Philippines: Climate Risk Profile, Mindanao" (Manila: International Centre for Tropical Agriculture (CIAT), Department of Agriculture of the Philippines, and FAO, 2019), https://cgspace.cgiar.org/handle/10568/113513
[121] Médecins Sans Frontières (MSF), "Displaced Communities in Marawi Living with COVID-19 and Ongoing Uncertainty," 17 July 2020, https://www.msf.org/displaced-marawi-living-covid-19-and-ongoing-uncertainty
[122] East-West Center, "Jakarta Flooding Prompts Plan to Relocate Indonesia's Capital," 19 May 2022, https://www.eastwestcenter.org/news/east-west-wire/jakarta-flooding-prompts-plan-relocate-indonesia-s-capital
[123] ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre), *ASEAN Risk Monitor and Disaster Management Review*, 2nd edn. (Jakarta: AHA Centre, 2020).
[124] Christopher Chen and Angelo Paolo L. Trias, "Water Security in Southeast Asia: Regional, National, and Sub-national Challenges," NTS Insight IN20-02, 5 May 2020, https://www.rsis.edu.sg/rsis-publication/nts/water-security-in-southeast-asia-regional-national-and-sub-national-challenges/

change is likely to present a critical health and challenge to communities from developing economies in Southeast Asia

3.5 Climate change and natural resources

While climate change has been recognised as a threat to global peace and security, and climate change adaptation and mitigation efforts such as transitioning to green energy have been promoted, less attention has been paid to how those measures could themselves affect peace and security.[125]

Southeast Asia is rich in natural resources, from forests to marine and coastal ecosystems, and increasingly significant, deposits of minerals critical to the green energy transition. Global and regional demand for such minerals, and the process of mining and processing them, could increase the vulnerabilities faced by local communities, whether on land or in the sea. Such forces could reinforce existing inequalities, increase competition for critical minerals, and influence new forms of governance. While this could be cause for improving local conditions such as land tenure, it could also be destabilising for peace and security.

This section, by focusing on developments associated with critical minerals, illustrates the need for a more comprehensive investigation into how climate change adaptation and mitigation measures could affect peace and security.

3.5.1 The case of critical minerals mining

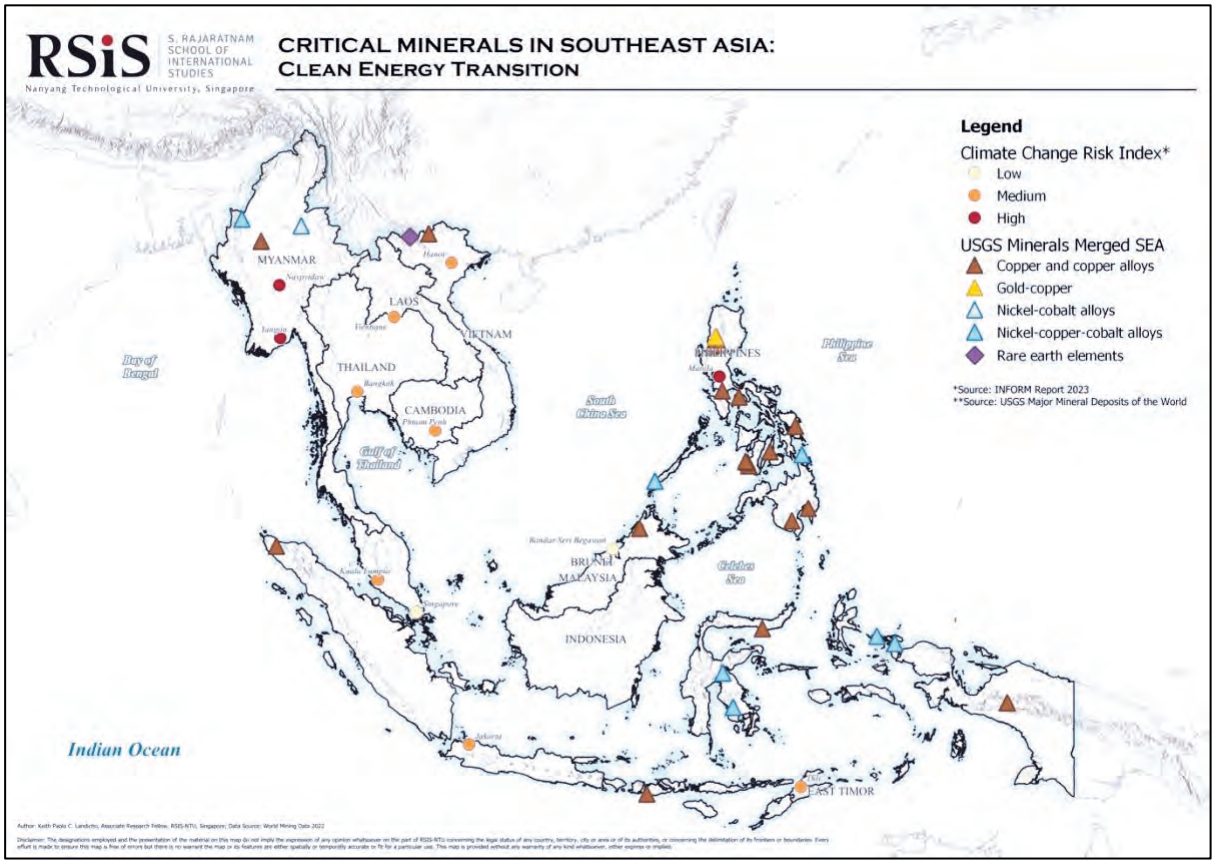
Climate change has significant implications for the demand and supply of minerals and metals – and therefore their strategic importance. Critical minerals are most often defined as minerals used to create components essential to the supply chain for the green energy transition. Intensified production of solar panels, wind turbines batteries for electric vehicles will require a significant ramp-up in the mining of critical minerals.[126]

Southeast Asia has gained in importance in global supply chains due to geopolitical competition. Countries worldwide have been reassessing their economic, political and security arrangements, to identify which countries could serve as sustainable partners that could contribute to more resilient and secure supply chains. There has already been some diversification out of China and into neighbouring countries like Indonesia, Malaysia and Vietnam, but such shifts have thus far largely involved labour-intensive

[125] Rod Myers et al., "Climate Change Mitigation in Forests: Conflict, Peacebuilding, and Lessons for Climate Security," Position Paper 2021/1, CGIAR FOCUS Climate Security, 2021.
[126] ASEAN and Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF), "ASEAN–IGF Minerals Cooperation: Scoping Study on Critical Minerals Supply Chain in ASEAN" (Winnipeg: International Institute for Sustainable Development, 2023), https://asean.org/book/asean-igf-minerals-cooperation-scoping-study-on-critical-minerals-supply-chains-in-asean/

industries.[127] The region is set to play an even greater role in global supply chains for the green energy transition, given that it has substantial deposits of several critical minerals (Figure 3.3). This has significant ramifications for Southeast Asia, both in terms of its sustainable development trajectory and also because of the related challenges to peace and security in the region from increased mining (and its localised impacts) and the greater geopolitical competition for the critical minerals.

Figure 3.3 Critical minerals in Southeast Asia (main deposits)



Source: United States Geological Survey, "Major Mineral Deposits of the World," accessed 6 November 2023, https://mrdata.usgs.gov/major-deposits/

The reconfiguration of global supply chains toward Southeast Asia incentivises vertical integration in ASEAN – taking direct ownership of various stages of production rather than relying on external suppliers – which increases the potential for intra-ASEAN connectivity, trade and capital flows. This alleviates concerns of investors in a region reliant on imports from China.[128] This will shift location and agency to within Southeast Asia, with the attendant challenge of ensuring a sustainable transition to a resilient ASEAN. This will further coincide with a shift from a linear to networked ecosystem

[127] Jayant Menon, "Supply Chains Are More Resilient than They Appear," East Asia Forum, 3 July 2022, https://www.eastasiaforum.org/2022/07/03/supply-chains-are-more-resilient-than-they-appear/
[128] Economic Development Board (EDB), Singapore, "ASEAN Poised to Increase Share of Global Trade as Manufacturers Seek More Resilient Supply Chains," 4 May 2003, https://www.edb.gov.sg/en/business-insights/insights/asean-poised-to-increase-share-of-global-trade-as-manufacturers-seek-more-resilient-supply-chains.html

where the arrangements of complex supply chains are based on the cloud and events can be acted upon by the different actors involved simultaneously.[129]

The demand for key minerals usable in clean technologies has been projected by the International Energy Agency (IEA) to consistently increase over the next decades, as shown in Figure 3.4. The upward trajectory is similar under various scenarios: stated policies (Figure 3.4a), announced pledges in the Paris Agreement (Figure 3.4b) or net-zero emission by 2050 (Figure 3.4c).

While the United Nations Climate Change Conference of the Parties or COP process aims for member states to negotiate collective solutions to climate change, the demand for a clean energy transition is accelerating geopolitical competition over access to critical minerals between producers and consumers. The challenge of the procurement of critical minerals is now a key obstacle to decarbonisation and international security.[130] These developments have become a critical component of how countries in Southeast Asia experience climate impacts and climate change adaptation and mitigation efforts on regional peace and security.

As noted earlier, ASEAN member states produce and refine large amounts of critical metals and minerals, in addition to being important manufacturing hubs with high potential to contribute to global supply chains. If the climate targets are to be met then there is a need to accelerate the extraction, refining and recycling of critical minerals.[131] However, given the wide variation in the stages of critical-mineral development and quantity of deposits across the region, there are significant challenges to developing a common approach to addressing potential regional insecurities from population movements, maladaptation practices or societal tensions. There is as yet not even a common definition of critical minerals in the region that could serve as a starting point. There is also a need to provide for mediation or arbitration to resolve communal and transnational disputes that threaten resilience in Southeast Asia.

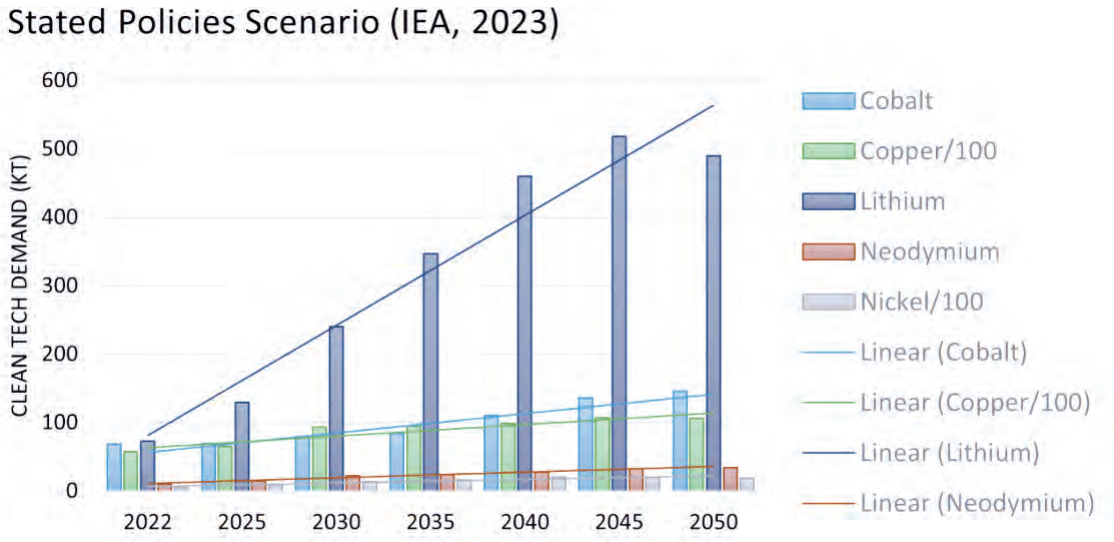
[129] Atul Chandna, Olivier Gergele, and Shaurya Ahuja. "Why Manufacturers Must Rethink Their Supply Chains in Southeast Asia," Ernst & Young Philippines Report, 21 February 2022, https://www.ey.com/en_ph/supply-chain/why-manufacturers-must-rethink-their-supply-chains-in-southeast-asia

[130] Gregory Brew and Morgan Bazilian, "The Mining Gap: Critical Minerals and Geopolitical Competition," *Just Security*, 7 November 2022, https://www.justsecurity.org/83982/the-mining-gap-critical-minerals-and-geopolitical-competition/

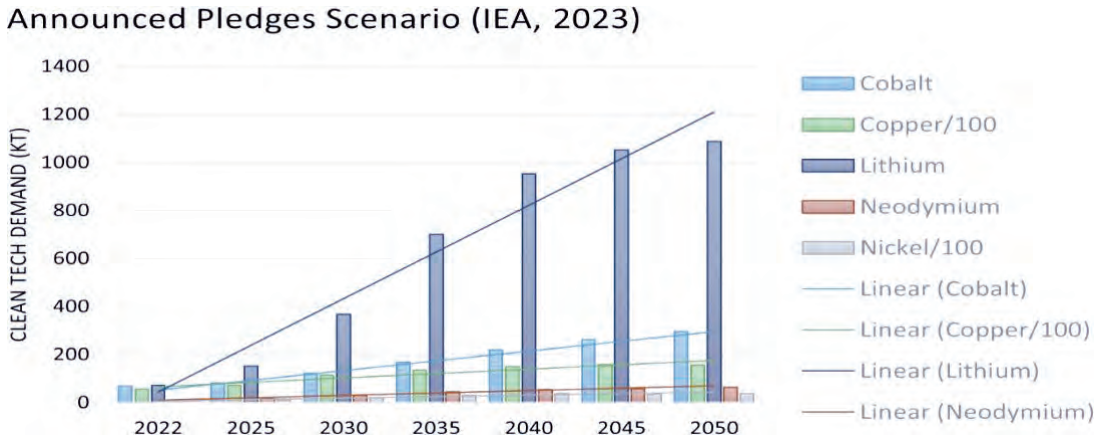
[131] Pavel Bilek, "ASEAN–IGF Minerals Cooperation: Scoping Study on Critical Minerals Supply Chains in ASEAN," IISD, 16 May 2023, https://www.iisd.org/publications/report/scoping-study-critical-minerals-asean

Figure 3.4 Projected demand of critical minerals in clean technology under three scenarios

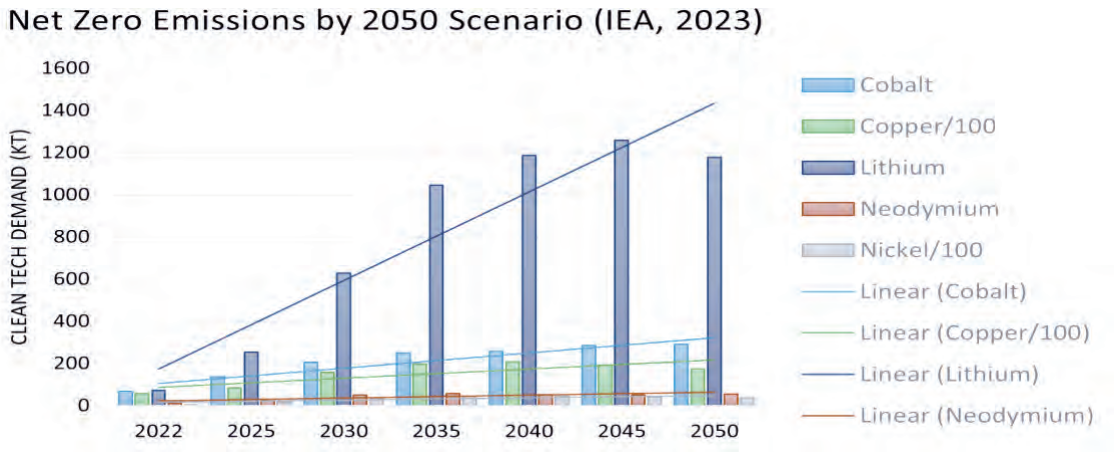
a.



b.



c.



Source: International Energy Agency (IEA), *World Energy Outlook 2022* (IEA, 2022), licensed under CC BY-NC-SA 4.0.

Potential hot spots

Through a regional scan of Southeast Asia, several hot spots are identified that warrant further investigation.

The first is Indonesia, which is ASEAN's most important mining and processing state. Indonesia hosts the largest nickel deposits in the world, mostly on the island of Sulawesi, and produces more than 48% of global output.[132] The US Geological Survey has estimated that nickel production in Indonesia increased by 54% in 2022, while global nickel prices increased by 35% compared to 2021.[133]

As a result of the seismic growth, tens of thousands of people have internally migrated in search of work. According to Indonesia's Manpower Ministry, the Indonesia Morowali Industrial Park (IMIP) – the centre of nickel extraction – had 28,000 employees in 2019 and 43,000 in 2020. While there are no figures for the wider migration pattern, there has been a significant increase in the general population attributed to those working in the service industries. At the same time, respiratory issues and eye pain among miners have risen.[134] The number of villages impacted by water pollution or reduced access to water attributed to the pollution caused by nickel exploitation has also increased. [135] The "dash for cash" to supply the growing global demand for critical minerals has outpaced the development of governance and regulations.[136] These developments have highlighted a negative dynamic to global commitments to address climate change that has not garnered the attention it deserves.

In the Philippines, bauxite mining on Samar Island has also given rise to insecurities. One of the challenges is that the island is a traditional stronghold of an insurgent group, and bauxite mining is having an impact on the ongoing communist insurgency. Bauxite mining faces strong opposition from the Catholic church and New People's Army because of the negative consequences on the natural resources that the area's subsistence farmers depend on.[137]

Lao PDR, Myanmar and Vietnam also face significant and varied challenges related to the exploration of critical minerals. In Lao PDR, critical minerals and metals have long accounted for a large share of output and exports. The typical issues of natural-

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[132] Vladimir Basov, "Global Nickel Production Up 21% in 2022 as Indonesian Output Jumps 54%," *Kitco News*, 6 February 2023, https://www.kitco.com/news/2023-02-06/Global-nickel-production-up-21-in-2022-as-Indonesian-output-jumps-54.html

[133] Basov, "Global Nickel Production Up 21%."

[134] For several investigations into the impacts of nickel mining on communities, please see: https://news.mongabay.com/

[135] For several investigations into the impacts of nickel mining on communities, please see: https://news.mongabay.com/

[136] Peter Yeung, "Workers Are Dying in the EV Industry's 'Tainted' City," *Wired*, 20 February 2023, https://www.wired.co.uk/article/workers-are-dying-in-the-ev-industrys-tainted-city

[137] Cris Reven L. Gibaga et al., "The Rare Earth Element (REE) Potential of the Philippines," *Journal of Geochemical Exploration* 242 (2022), https://doi.org/10.1016/j.gexplo.2022.107082

resource exploitation that have been discussed such as impacts on traditional livelihoods and land use will likely further exacerbate tension with local communities.

In Myanmar, the combination of the recent military takeover of the government and the increasing significance of the country as a source of critical minerals will likely lead to more governance and regulatory challenges and further stoke tensions with the population. While the exploitation of critical minerals has long impacted internal conflicts in Myanmar, the potential for an expansion of mining activities in post-coup Myanmar to meet rising global climate imperatives needs further study.

3.5.2 Governance challenges and issues

Vietnam has significant critical mineral deposits, particularly along the Vietnam–China border and in the Highland Provinces, which are home to ethnic minorities. Moves to extract those minerals could exacerbate tensions with local populations, which suggests a greater need to provide for mediation and arbitration between investors and local communities. Without sufficient investment in governance and regulation, the tensions could escalate into more serious concerns.

Brunei, Cambodia, Malaysia, Singapore and Thailand do not have critical mineral deposits or have not been traditional critical minerals producers. However, they are important processing, recycling and manufacturing hubs and are likely to see increased investment and activity in these areas.

As shown here through this regional scan, the structural changes in global supply chains and the push for an energy transition that would contribute toward global climate security could exacerbate pre-existing tensions and create new insecurities in the region. This will require a more concerted effort to improve whole-of-government approaches to address the impacts on peace and security in Southeast Asia. While these conditions are in their early stages, there is the potential to integrate appropriate mechanisms within the region to face these head on.

3.5.3 ASEAN frameworks on critical minerals and climate change

Cooperation in ASEAN in the mineral sector began in 2005 through a Ministerial Understanding on ASEAN Cooperation in Minerals. In the same year, ASEAN established the ASEAN Ministerial Meeting on Minerals and agreed on the ASEAN Minerals Cooperation Action Plan (AMCAP-I). This began a series of five-year AMCAPs, with the latest being the period until 2025. As ASEAN moves toward 2025, there will be a greater focus on sustainable development, including capacity building for green mining technologies and improving opportunities to enhance the environment for minerals trade as well as to attract greater investments in resource development and processing. The discussion on critical minerals per se is at the early stages, with the release of the Critical Minerals Scoping Study in May 2023 by ASEAN

and the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) forming part of the wider discussion on cooperation in minerals.[138]

With the significant shift underway in mining critical minerals in Southeast Asia, ASEAN is well placed to address the emerging concerns and negative impacts that critical minerals mining poses to peace and security in the region. In particular, there needs to be a focus on hot spots where critical mineral deposits are located, along the China–Vietnam border, and within ASEAN member states with significant ethnic minority or Indigenous populations and vulnerable communities. The potential impacts on peace and security discussed in this section also highlight the need for more comprehensive, in-depth assessments across the region.

3.6 Climate change, disasters and sea-level rise

In Southeast Asia, supply chain vulnerability has occurred less as a result of global shocks and more by country- or region-specific shocks like the 2011 floods in Thailand.[139] As a result of the likely increase in frequency and intensity of natural hazards and sea-level rise due to climate change, countries in Southeast Asia have focused their efforts over the past two decades on improving governance and regulation to address the impacts of these events.

However, climate change threatens the consensus-building approach that has characterised regional security efforts. With the escalating frequency and intensity of natural hazard events and sea-level rise, the regional security community faces challenges to the essence of how it conducts business. With national capacities stretched to respond to concurrent and sequential natural hazards, the underinvestment in sustainable development and infrastructure becomes plain to see.

Further, the impacts will disproportionately fall on more exposed communities, highlighting structural inequities in countries around the region. Table 3.5 shows that across both the moderate climate scenario (RCP 4.5) and the worst-case climate scenario (RCP 8.5), Indonesia, Lao PDR, Myanmar, the Philippines and Vietnam will see their percentage of population with a low/medium Human Development Index (HDI) score increase, suggesting additional layers of vulnerability among their populations.

[138] ASEAN and IGF, “ASEAN–IGF Minerals Cooperation: Scoping Study.”
[139] Menon, ‘Supply Chains Are More Resilient.”

Table 3.5 Population with low/medium HDI under two climate change scenarios

Country	% of population with low/medium Human Development Index (HDI) score			
	Under RCP 4.5		Under RCP 8.5	
	2020–2039	2040–2059	2020–2039	2040–2059
Cambodia	7	4	26	25
Indonesia	7	15	14	15
Lao PDR	14	23	26	30
Myanmar	29	26	47	50
Philippines	15	24	26	30
Thailand	0.28	0.09	0.39	0.45
Timor Leste			18	8
Vietnam	12	23	25	30

HDI=Human Development Index.
Note: RCP 4.5 refers to the intermediate scenario for reductions in carbon emissions, while RCP 8.5 is the "business-as-usual" (high emissions) scenario.
Source: United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), "Asia Pacific Disaster Report 2021 – Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards" (Bangkok: ESCAP, August 2021), https://www.unescap.org/sites/default/d8files/2021-08/APDR%202021%20-%20Executive%20Summary.pdf

3.6.1 Governance challenges and issues

While disaster governance has improved in Southeast Asia, states and societies show some degree of complacency. They continue to rely on military-led disaster responses, and has reduced their system and infrastructure investment and adaptation. There is also insufficient political momentum to address the security challenges that climate change and the intersecting risks pose.

These gaps were revealed by the COVID-19 global pandemic, which saw the convergence of different generators of insecurity such as pandemics and climate change. The pandemic also revealed the need to build trust and cooperation between countries and with the region's partners to avert the compounding of impact (pandemic impacts overlaying disaster impacts for example) and the need to rethink the parameters and role of the military. Consequently, there has been increasing priority placed on converging risks in national security discussions in Southeast Asia. The following discusses further some of the most pressing governance issues facing the region.

Militaries across the Indo-Pacific have long been prominent first responders to natural hazards, from typhoons and cyclones to earthquakes and volcanic eruptions. Human-induced climate change will likely cause more intense and frequent cyclones and typhoons.[140] This will mean that militaries will be more frequently deployed in these events unless change occurs in the organisation of governance and security.

[140] IPCC, *Climate Change 2021: The Physical Science Basis* (Cambridge and New York: Cambridge University Press, 2021), https://www.ipcc.ch/report/ar6/wg1/

Furthermore, the emerging challenges are twofold. On the one hand, natural hazards will impact local areas. On the other, there is increasing awareness among political leaders regarding the exposure of capital and primary cities to rising sea levels and natural hazards, and the relocation of these urban areas has risen up the policy agenda. With the prospect of mass relocation of exposed urban populations to less exposed surroundings, political leaders will need to integrate pre-existing social, political, environmental, and economic considerations.

There is also the prospect of more flooding in Southeast Asia, affecting coastal cities and surrounding areas. A 2023 study mapping sea-level hot spots around the globe identified Bangkok, Ho Chi Minh City, Manila and Yangon as among the cities that may face significant risks if society emits high levels of greenhouse gas.[141] While sea levels rise with warming oceans, this study incorporated naturally occurring sea-level fluctuations caused by El Niño or climate variability. It found that these fluctuations can amplify or reduce climate change impact along certain coastlines. The study showed that internal climate variability could increase sea-level rise in some locations by 20 to 30% over that from climate change alone. In Manila, coastal flooding events are expected to occur 18 times more often by 2100 than in 2006 as a result of climate change. In the worst-case scenario, coastal flooding could occur 96 times more often based on a combination of climate change and climate variability.[142] The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) estimates that the economic costs from the combined impacts at the disaster–climate–health nexus would come to, in Southeast Asia, a total average annual loss of USD 91 billion dollars. This estimate increases to USD 108 billion dollars under the moderate climate scenario (RCP 4.5) and to USD 127 billion dollars under the worst-case climate scenario (RCP 8.5).[143]

Rising sea levels also affect maritime baseline boundaries as coastal areas move inwards and islands submerge in the sea. This could worsen tensions between countries in the region unless the freezing of baselines takes place. This is further complicated by territorial disputes where these lines of demarcation are contested. While there is a growing realisation that there needs to be agreement to resolve these potential or exacerbated tensions ahead of time, the issue remains underappreciate and underexplored.

Across Southeast Asia, countries are dealing to with the governance challenges posed by weather-related disasters and sea-level rise. In Indonesia, preparations include moving significant portions of the capital city Jakarta to Nusantara in East Kalimantan.

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[141] Melanie Becker, Mikhail Karpytchev and Aixue Hu, “Increased Exposure of Coastal Cities to Sea-level Rise due to Internal Climate Variability,” *Nature Climate Change* 13 (2023), https://doi.org/10.1038/s41558-023-01603-w

[142] Becker et al., “Increased Exposure of Coastal Cities to Sea-level Rise.”

[143] ESCAP, “Asia-Pacific Disaster Report 2022 for ESCAP Subregions: Pathways to Adaptation and Resilience in South-east Asia” (Bangkok: UN, 2022), 5, file:///Users/xprivilege/Downloads/ESCAP-2022-RP-Asia-Pacific-disaster-report-ESCAP-subregions-pathways-adaptation-resilience-South%20East-Asia.pdf

While this is largely a result of the city sinking due to water extraction, the rising Java Sea levels has shortened the time frame for the move as an estimated one third of Jakarta would be underwater by 2050.[144] There are concerns that the extensive development in Nusantara to accommodate the mass relocation would endanger animals and the environment and displace local communities. There is, however, to date, no study specifically addressing the economic cost of the displacement.[145]

In the case of Vietnam, it faces high disaster risk levels, ranking 91 out of 191 countries in the 2019 INFORM Index. It ranks first along with Bangladesh for exposure to riverine, flash and coastal flooding. Vietnam is also highly exposed to tropical cyclones and associated hazards. Drought exposure is lower but remains significant as witnessed in the severe drought of 2015–2017. Climate change is recognised as having significant impacts on disaster management and poses threats to those most vulnerable.[146]

Vietnam is also among the most affected in the world by sea-level rise due to the location of its major urban centres and its intensely cultivated land in low-lying areas. Rising sea levels are already affecting the agricultural landscape in the Mekong Delta, with brackish water at the lowest level making local food production difficult. Although less attention has been paid to the Red River Delta, at the second largest river in Vietnam, the impacts there could be significant that is home to the capital city. Its catchment area also covers parts of Vietnam and China. Further, the threat from cyclones will be exacerbated by rising sea levels and increased rainfall.[147]

In December 2006, Typhoon Durian hit the southern provinces of Vietnam, killing 95 people and causing property damage of USD 456 million.[148] A recent study found that the economic impact of Typhoon Durian was long-lasting, with the impact on salaries from agriculture, fisheries, and forestry stretching eight years.[149] With climate change highly likely to cause more frequent and intense extreme weather events, it is conceivable that cause there will occur concurrent disasters, where recovery from one event has not occurred before the onset of a subsequent one, compounding the disaster impacts, more severely impacting vulnerable communities and amplifying insecurities.

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[144] Edna Tarigan and Victoria Milko, 'Why Indonesia Is Moving Its Capital from Jakarta to Borneo," *PBS Newshour*, 9 March 2023, https://www.pbs.org/newshour/world/why-indonesia-is-moving-its-capital-from-jakarta-to-borneo

[145] United Nations Office for Disaster Risk Reduction (UNDRR), 'Disaster Risk Reduction in Indonesia: Status Report 2020" (Bangkok, UNDRR, 2020).

[146] World Bank, '"Vietnam: Risk," Climate Change Knowledge Portal, accessed 6 November 2023, https://climateknowledgeportal.worldbank.org/country/vietnam/vulnerability

[147] James E. Neumann et al., "Risks of Coastal Storm Surge and the Effect of Sea-level Rise in the Red River Delta, Vietnam," *Sustainability* 7, no. 6 (2015), https://doi.org/10.3390/su7066553

[148] Khac Hieu Nguyen and Thi Thu Tra Pham, "Long-term Impact of Natural Disasters on Vietnamese Income per Capita: The Case of Typhoon Durian," *Entrepreneurship and Sustainability Issues* 8, no. 1 (2020), http://doi.org/10.9770/jesi.2020.8.1(41)

[149] Nguyen and Pham, "Long-term Impact of Natural Disasters on Vietnamese Income."

In the Philippines, the sea level has already risen 60 centimetres, about three times the global average. With more than half of its cities and people located along the coastline, it is among the most vulnerable to sea-level rise. In the words of Ambassador and deputy permanent representative Ariel Rodelas Peñaranda, chargé d'affaires of the Philippine mission to the United Nations, "the nation's sovereignty and territorial integrity, the people's well-being, core values, and way of life, among others, are being threatened, especially those living in the coastal areas[150] This framing underlines the comprehensive approach to security common in Southeast Asia where security considerations encapsulate both state and human security concerns.

From the above, and as signalled in the IPCC *Climate Change 2021* report, there is a need for a mindset shift toward a strategic approach to managing intersecting security challenges. A holistic view of climate, peace and security is needed, where not only the direct impacts of climate events are considered but also their indirect impacts as part of a whole-of-society approach. What has become clearer through the regional scan of Southeast Asia is the multi-dimensional impacts climate change has on the security environment, including the impact of mass relocation of populations on new host communities and those left behind; temporary internal displacement due to the increasing frequency and intensity of natural hazards; the increasing use of militaries for humanitarian assistance and disaster relief (HADR); and the potential for escalation of tensions between countries as a result of sea-level rise through changing geographies and population displacement along borders.

These challenges require a more concerted effort in revitalising preventive and comprehensive security as part of the regional security architecture with an elevated focus on climate impacts. As sea-level rise will be sustained and gradual while extreme weather events are less predictable, bespoke approaches are needed to address these climate impacts on peace and security. While the nomenclature of climate, peace and security per se is not articulated in the regional security discourse, climate impacts will leave an indelible mark on peace and security in Southeast Asia.

3.6.2 ASEAN frameworks on disaster management

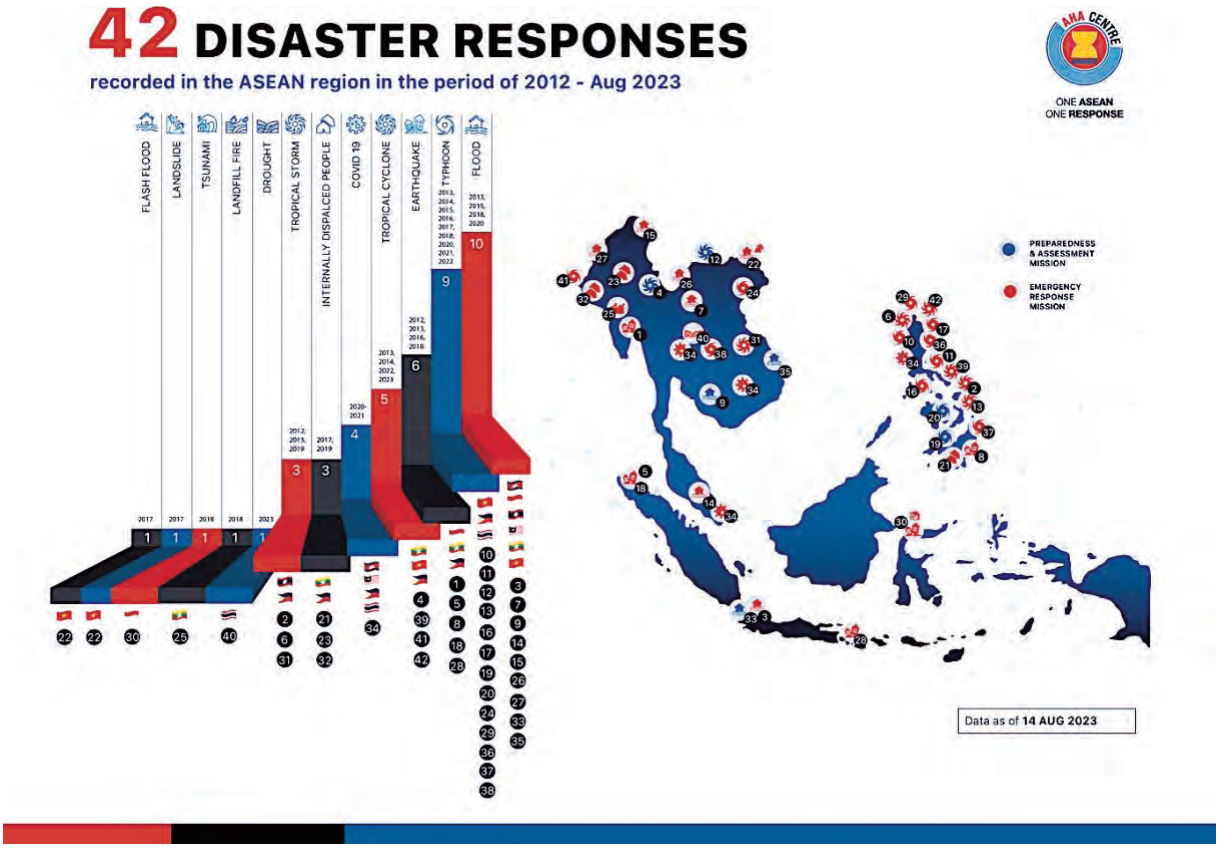
ASEAN has placed focus on disaster management since the establishment of the ASEAN Committee for Disaster Management (ACDM) in 2003 and the subsequent signing of the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) in 2008. The ACDM produces the AADMER Work Programmes that implement the key strategies for the implementation of the agreement. The AADMER further established the framework for regional operational cooperation through the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management

[150] Pia Lee-Brago, "Rising Sea Level Threatens Stability of Boundaries, Philippines Warns," *The Philippine Star*, 20 February 2023, https://www.philstar.com/headlines/2023/02/20/2246224/rising-sea-level-threatens-stability-boundaries-philippines-warns

(AHA Centre) which was established in 2011. Over the period 2012 to August 2023, 42 disaster responses were recorded by the AHA Centre, illustrating its impact.

At the regional and diplomatic levels, there is documented progress and commitments that are strategically aligned with global agendas such as the Sendai Framework for Disaster Risk Reduction and the UN Sustainable Development Goals. Yet recent reports, such as the *Asia-Pacific Disaster Report 2022*, show that across nearly all indicators, the region is regressing in terms of its 2030 targets. These limitations highlight the need to invest more in disaster preparedness now to face the new climate reality. While early warning is included in the AADMER Work Plans, there remains a need to maintain investment in these efforts. This has become more acute as governments in the region face multiple challenges that draw attention and resources away from disaster management.

Figure 3.5 Disaster responses in the ASEAN region, 2012–2023



Source: ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre). "List of Disaster Responses," accessed 6 November 2023, https://ahacentre.org/list-of-disaster-responses/

The regional commitments are outlined in several initiatives on disaster management. In 2016, ASEAN member states signed the Declaration on One ASEAN One Response (OAOR): ASEAN Responding to Disasters as One in the Region and Outside the Region. This declaration recognised that AADMER is the main regional

policy framework for disasters and the common platform for the implementation of OAOR. The declaration tasked the Joint Task Force to Promote Synergy with Other Relevant ASEAN Sectoral Bodies on Humanitarian Assistance and Disaster Relief (JTF on HADR) to promote synergy and coordination, including streamlining ASEAN HADR activities. The declaration also reaffirmed the AHA Centre as the primary ASEAN regional coordinating agency on disaster management and emergency response.[151] Further the AADMER Work Programmes map key outputs, activities and flagship projects to implement the agreement, address regional challenges and provide frameworks for action.

There are two examples of how the regional disaster management community contributes to addressing climate-related human insecurities in ASEAN. The first is a policy initiative on the implementation of social protection measures to increase regional resilience. The *ASEAN Guidelines on Disaster Responsive Social Protection to Increase Resilience*, released in 2021*,* charts a way forward for inclusive development and reduction in societal insecurities as a result of climate change. Addressing vulnerable groups in disaster risk reduction strategies is vital to ensure the inclusiveness of disaster responses; it is equally essential for sound social protection, before, during and after disasters take place.[152]

The second example is from Priority Programme 3 (ADVANCE: A Disaster Resilient and Climate Adaptive ASEAN Community) in the AADMER Work Programme. This component includes a project on "Disaster Risk Reduction by Integrating Climate Change Projection into Flood and Landslide Risk Assessment (ASEAN DRR-CCA)". The focus on this project is on reducing losses from and collectively responding to disasters through early warning systems, the involvement of women in community risk reduction plans, and the trial of an alternative funding model for vulnerable communities in riverine and coastal communities.[153]

Further, in 2021, ASEAN launched the ASEAN Disaster Resilience Outlook that charts the way ahead to 2025, 2025–2030 and 2035 in institutionalisation and communication, finance and resource mobilisation, and partnerships and innovation.[154] The regional policy developments in Southeast Asia on disaster management illustrates the comprehensive nature of security in ASEAN and signals its commitment to regional resilience and greater synergy across sectors. Indeed, ASEAN is involved in a cooperative effort with the United Nations to address the

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[151] ASEAN, "AADMER Work Programme 2021–2025" (Jakarta: ASEAN Secretariat, 2021), 18, https://asean.org/wp-content/uploads/2021/08/AADMER-Work-Programme-2021-2025.pdf
[152] ESCAP, "Asia-Pacific Disaster Report 2022: South-East Asia," 22.
[153] Institute for Global Environmental Strategies (IGES), 'Building Resilient ASEAN Communities through Participatory Approaches to Disaster Risk Assessment and Management," ASEAN, 31 March 2023, https://asean.org/building-resilient-asean-communities-through-participatory-approaches-to-disaster-risk-assessment-and-management%E2%80%8B/
[154] ASEAN, "ASEAN Disaster Resilience Outlook – Preparing for a Future Beyond 2025" (Jakarta: ASEAN Secretariat, 2021), https://asean.org/book/asean-disaster-resilience-outlook-preparing-for-a-future-beyond-2025/

impacts of El Niño.[155] Nevertheless, implementation challenges continue to pose a significant hurdle for the regional community in realising its resilience vision. Also, while the overarching frameworks to tackle regional insecurities amplified by climate change are in place, the disaggregated impacts within and between communities in the region need greater priority.

3.7 Climate change and gender

As has been highlighted in previous sections of this report, inclusiveness – particularly of vulnerable groups – is a key component in managing climate change and its impacts in the region. Any scan of the potential impacts of climate change in Southeast Asia that does not look at specific challenges faced by specific groups, is likely to face gaps in its perceptions of, and solutions to, the challenges that the broader region needs to deal with. The region is familiar with crises, from disasters to the COVID-19 pandemic. Such crises have demonstrated the disproportionate impacts faced by women and other marginalised groups. The inclusion of gender is thus vital. After all, with the 'threat multiplier' nature of climate change and the increasing likelihood of intensifying effects in the future, ignoring half of the population is unlikely to be a winning strategy.

In Southeast Asia, there is significant formal commitment to gender equality. The Convention for the Elimination of All Forms of Discrimination against Women (CEDAW) has been ratified by all ASEAN member states. There is also an ASEAN Regional Plan of Action on the Elimination of Violence against Women (2015). However, for all this formal acknowledgement, gender equality has not been fully translated into reality. It has been estimated that it will take another 286 years to remove discriminatory laws and close prevailing gaps in legal protections for women and girls, highlighting the challenges that lie ahead for women, particularly with climate change likely to compound existing vulnerabilities.[156]

3.7.1 Socio-economic security

Climate change is likely to have a significant impact on the economic security of women. Agriculture in particular is a crucial source of livelihoods across the region and remains a significant employer of women. In Southeast Asia, the agricultural sector has the largest share of female employment, with more than 25% of women employed in the sector.[157] Considering the propensity for agricultural work to be considered part

[155] Programme titled "Preparedness for Response and Recovery for El Niño-associated Risks in Southeast Asia". It is a joint programme led by the ASEAN Disaster Committee on Disaster Management (ACDM) Working Group on Preparedness Response and Recovery and implemented by the ASEAN Secretariat, the AHA Centre and the United Nations Development Programme (UNDP).
[156] UN Women and UN Department of Economic and Social Affairs (DESA), "Gender Snapshot 2022: Progress on the Sustainable Development Goals," 2022, https://www.unwomen.org/sites/default/files/2022-09/Progress-on-the-sustainable-development-goals-the-gender-snapshot-2022-en_0.pdf
[157] International Labour Organization (ILO) and ADB, "Where Women Work in Asia and the Pacific: Implications for Policies, Equity and Inclusive Growth" (Geneva and Manila: International Labour Office and ADB, 2023), https://www.adb.org/sites/default/files/publication/916051/where-women-work-asia-pacific.pdf

of domestic activities and its seasonal nature, official statistics are likely to underestimate the true percentage of women involved in the agricultural sector, especially for rural women.

With agriculture being exceptionally exposed to the impacts of climate change, women in this sector are particularly vulnerable. This is exacerbated by women's lower access to land, water, ownership of livestock and other forms of agricultural resources due to the patriarchal norms still prevalent in the region.[158] The lack of resources limits their decision-making power and financial capacity. This is particularly true for rural women. For example, in Cambodia, 76% of the female population live in rural areas. However, even with women having legal access to ownership and inheritance, only 11.7% of agricultural lands are owned by women.[159] Despite various gender-responsive government policies such as the 2006 Gender Mainstreaming Policy and Strategy in Agriculture and the Agriculture Strategic Development Plan 2019-2023, patriarchal customary norms and low levels of female literacy have limited women's access to information, which may lead to some women being unaware of their right to ownership.[160]

Having equal access to and control over resources is key to achieving gender equality and economic security for women in the agricultural sector, while seeking peace-positive climate action. With rights over land, water and livestock, women would have increased decision-making power, both within the household and over their livelihoods.[161] It is therefore of utmost importance to understand the context of the lives of rural women and/or women farmers and take into account the power imbalances when developing inclusive policies and interventions to address gendered impacts.

3.7.2 Gender-based vulnerabilities affected women

Women are also at significantly higher risk during humanitarian situations. Pre-disaster, women and girls were already starting from a point of vulnerability due to existing power dynamics and unequal access to social, political and economic

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[158] FAO, "The Status of Women in Agrifood Systems" (Rome: FAO, 2023), https://www.fao.org/documents/card/en/c/cc5343en, ASEAN and UN Women, "State of Gender Equality and Climate Change in ASEAN" (Jakarta: ASEAN Secretariat, 2022), https://asean.org/wp-content/uploads/2022/08/State-of-Gender-Equality-and-Climate-Change-in-ASEAN_FINAL-1.pdf; Lengga Pradipta, "Land Resources Management in Southeast Asia: Redefining the Role of Women as Land Managers," *Komunitas: International Journal of Indonesian Society and Culture* 12, no. 2 (2020), https://doi.org/10.15294/komunitas.v12i2.24977

[159] UN Women and Cambodia Development Resource Institute (CDRI), "State of Gender Equality and Climate Change in Cambodia" (UN Women and CDRI, 2021), https://www.uncclearn.org/wp-content/uploads/library/final-digital_cambodia_report.pdf

[160] Organisation for Economic Co-operation and Development (OECD), "Strengthening Women's Entrepreneurship in Agriculture in ASEAN Countries" (OECD, 2021), https://www.oecd.org/southeast-asia/regional-programme/networks/OECD-strengthening-women-entrepreneurship-in-agriculture-in-asean-countries.pdf; Ha Nguyen, Sofie Mortensen and Pin Pravalprukskul, "Pathways for Women's Empowerment in Agriculture in South and Southeast Asia," Discussion Brief, Stockholm Environment Institute, 2019, https://www.sei.org/publications/pathways-for-womens-empowerment-in-agriculture-in-south-and-southeast-asia/

[161] My Nguyen and Kien Le, "The Impacts of Women's Landownership: Evidence from Vietnam," *Review of Development Economics* 27, no. 1 (2023), https://doi.org/10.1111/rode.12941

resources. When a disaster strikes, not only do they face heightened risks due to displacement and the breakdown of normal protection structures and support, they also face an increase in care-related tasks, such as providing food and water and caring for the sick.[162]

Women and girls face significantly increased risk of physical harm during and after disaster events. During times of disasters, women and children are 14 times more likely to die than men.[163] During the 2004 tsunami in Banda Aceh in Indonesia, 55–70% of the deaths were women, and in the hardest-hit village of Kuala Cangkoy, women made up 80% of the deaths.[164] Similar figures have been reported in India and Sri Lanka, demonstrating a serious imbalance of male to female survivors.[165] While this imbalance is in part related to cultural norms, with more men than women able to swim and climb trees, it is important to note that the gendered impacts of disasters do not manifest themselves in a vacuum. For example, the digital gender gap is a factor in limiting women's access to resources. In 2019, 48.3% of men in the Asia-Pacific accessed the internet, compared with 41.3% of women.[166] The consequent inability to access vital and perhaps life-saving information limits the ability of vulnerable women in preparing for, responding to and recovering from disasters.

The historical and current inequalities that affect women have meant that they tend to be poorer, less educated and hold fewer decision-making powers, which make them even more vulnerable than men to climate-related hazards. It is therefore vital to consider the specific lived experiences, vulnerabilities and needs of women and girls when crafting policies related to climate mitigation and adaptation in order to prevent these policies from maintaining or exacerbating gender inequities.

3.7.3 Participation and representation

The principle of "gender and social inclusion" is a key priority area for ASEAN. It is in various AADMER Work Programmes, including the most recent iteration. ASEAN has also established the ASEAN Regional Framework on Protection, Gender and Inclusion in Disaster Management 2021–2025 to articulate a common vision for ASEAN countries and provide regional support to ASEAN member states in setting priorities,

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[162] Silke Staab, Constanza Tabbush, and Laura Turquet, "Always on the Frontline in Every Crisis," SDG Action, 1 March 2023, https://sdg-action.org/always-on-the-frontline-in-every-crisis/

[163] Senay Habtezion, "Gender, Adaptation and Disaster Risk Reduction" (New York: United Nations Development Programme, 2016), https://www.undp.org/sites/g/files/zskgke326/files/publications/UNDP%20Gender,%20Adaptation%20and%20DRR%20Policy%20Brief%202-WEB.pdf

[164] United Nations Development Fund for Women (UNIFEM), "UNIFEM Responds to the Tsunami Tragedy – One Year Later: A Report Card", 2005, file:///Users/xprivilege/Downloads/AEC8595ED6FCCDEC492570DC000FDDB2-unifem-tsunami-19dec.pdf

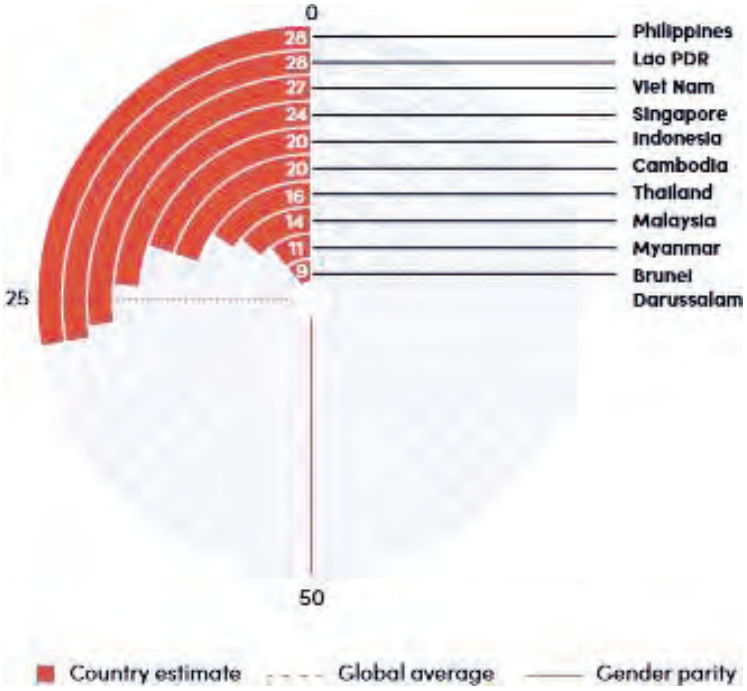
[165] Oxfam, "The Tsunami's Impact on Women," Briefing Note, 2005, https://www.preventionweb.net/files/1502_bn050326tsunamiwomen.pdf

[166] International Telecommunication Union (ITU), "Women, ICT and Emergency Telecommunications: Opportunities and Constraints" (Geneva: ITU, 2020), https://www.itu.int/en/ITU-D/Emergency-Telecommunications/Pages/Women-ICT-and-Emergency-Telecommunications.aspx

indicators and targets in the face of disasters – an ever-increasing challenge in the face of climate change.

As emphasised in the various regional and international frameworks including the Gender Action Plan of the UNFCCC and various ASEAN initiatives, the participation of women is a key factor in achieving and sustaining the equal and meaningful role of women in managing and mitigating climate-induced risk. In fact, there is emerging evidence that increased female political representation in national parliaments is leading to more stringent climate change policy outcomes.[167]

Figure 3.6 Proportion of seats held by women in national parliament (%), 2020



Source: Sara Duerto-Valero, Sneha Kaul, and Ryce Chanchai, "ASEAN Gender Outlook 2021" (Jakarta and Bangkok: ASEAN Secretariat and UN Women, 2021), https://data.unwomen.org/sites/default/files/documents/Publications/ASEAN/ASEAN%20Gender%20Outlook_final.pdf

However, women are still underrepresented at all levels of decision making worldwide, and achieving gender parity in political life is far off. As of 2023, there are 28 women serving as heads of state and/or government in 26 countries:[168] 22.8% of government ministers around the world were women, with only 13 countries having achieved 50% or more women in cabinet positions.[169] As seen in Figure 3.6, an average of 20% of parliament seats are occupied by women in Southeast Asia. Among ASEAN member

[167] Astghik Mavisakalyan and Yashar Tarverdi, "Gender and Climate Change: Do Female Parliamentarians Make Difference?", *European Journal of Political Economy* 56 (2019), https://doi.org/10.1016/j.ejpoleco.2018.08.001
[168] UN Women, "Facts and Figures: Women's Leadership and Political Participation," updated 18 September 2023, https://www.unwomen.org/en/what-we-do/leadership-and-political-participation/facts-and-figures
[169] UN Women, "Facts and Figures: Women's Leadership and Political Participation."

states, the Philippines and Lao PDR have the highest proportion of women parliamentarians at 28 and Brunei Darussalam has the lowest proportion at 9%[170]

Women's participation in ground-level climate initiatives are also key in translating their experiences into policy – as has been acknowledged at the regional level. For example, under the 2016–2020 AADMER Work Programme, the ASEAN DRR-CCA project engaged members of local communities, including women, in developing community risk reduction plans for riverine and coastal communities.[171] The engagement of civil society organisations is therefore paramount in building women's resilience in the face of climate change. However, the need for government-level initiatives that are not just gender-aware but also gender-responsive are still necessary as seen by the National Action Plans on Women, Peace and Security created by ASEAN member states such as Indonesia and the Philippines, with Cambodia and Vietnam still developing theirs.[172] For example, Vietnam's National Target Plan for responding to climate change has gender equality as one of its guiding principles. However, the involvement of women in consultations on the development of the plan has been limited, and few concrete targets have been set. This may be due in part to there being relatively few women officials in the ministries involved, such as in the Ministry of Natural Resources and Environment and the provincial Departments of Natural Resources and Environment.[173]

However, it is not enough to promote participation, as important as that is. Participation also needs to be gender mainstreamed. Women generally tend to bear the brunt of unpaid domestic work, and this can increase significantly during times of crisis as seen during COVID-19, when 30% of women reported seeing increases in the intensity of unpaid domestic work as compared to 16% of men.[174] This may limit their ability to participate in initiatives organised by government agencies, non-governmental organisations (NGOs) or other climate actors. As such, initiatives that seek to empower women must either work around their domestic work schedules (so that they are not overburdened) or work to lighten their load such as by offering childcare while women take part in climate initiatives. In other words, the lived realities of women need to be considered to ensure that promoting women's participation in climate initiatives do not further overburden them in the guise of empowering them.

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[170] Sara Duerto-Valero, Sneha Kaul, and Ryce Chanchai, "ASEAN Gender Outlook 2021" (Jakarta and Bangkok: ASEAN Secretariat and UN Women, 2021), https://data.unwomen.org/sites/default/files/documents/Publications/ASEAN/ASEAN%20Gender%20Outlook_final.pdf

[171] IGES, "Building Resilient ASEAN Communities."

[172] Women's International League of Peace and Freedom, "National Action Plans by Region," accessed 13 October 2023, http://1325naps.peacewomen.org/index.php/nap-overview/

[173] Peter MacKay and Michael Russell, "Socialist Republic of Viet Nam: Climate Change Impact and Adaptation Study in the Mekong Delta," Asian Development Bank, 2011, https://www.adb.org/sites/default/files/project-documents/43295-012-tacr-03a_0.pdf

[174] Duerto-Valero et al., "ASEAN Gender Outlook 2021."

3.8 Climate change and forced migration

In today's interconnected world, climate change is clearly not just a threat in and of itself, but also in the ways in which it interacts with the economic, environmental, political and societal context – intensifying existing vulnerabilities and forcing a rise in insecurity. With climate change steadily climbing the list of the most pressing threats to humanity, it is prudent to take into account its effect on drivers of migration in Southeast Asia.[175] Not only is climate change triggering potential increases in (internal as well as international) displacement through more direct impacts such as disasters, the indirect impacts of climate change are also taking its toll on communities as well. Climate change could have indirect impacts such as rendering homes uninhabitable or livelihoods not sustainable, forcing populations into permanent displacement. In Southeast Asia, with millions already moving within and outside the region for employment, and refuge, the effects of climate change are likely to influence these pathways. This poses additional risks to irregular migrants who follow more precarious routes and could compound their vulnerability to risks such as human trafficking and forced displacement.[176]

3.8.1 Climate-induced displacement of communities

As adverse impacts from climate change continue to intensify – as the IPCC Sixth Assessment Report has clearly declared would happen – so will the stress on humanity, particularly those who live and work in climate-exposed regions and sectors such as Southeast Asia.[177] The statistics surrounding internally displaced persons (IDPs) are potentially an insight into the future. As of end 2022, 71.1 million people worldwide are internally displaced.[178] Not only is this the highest number ever recorded, but it is also a staggering 20% increase over the previous year.[179] In 2022 alone, 32.6 million people were internally displaced, with more than half of these displacements triggered by disasters.[180] Out of these disaster displacements, over 6.27 million people come from Southeast Asia alone. Already a worrying number, these numbers might only continue to rise as the impacts of climate change continue to worsen. Increased conflict as a result of climate could also aggravate displacement numbers.

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[175] WEF, *Global Risks Report 2023*.
[176] International Organization for Migration (IOM), "Empowering Migrants during Crises: Climate Action in Southeast Asia," 13 October 2022, https://weblog.iom.int/empowering-migrants-during-crises-climate-action-south-east-asia
[177] IPCC, "Summary for Policymakers," in *Climate Change 2023: Synthesis Report* (Geneva: IPCC, 2023), https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf
[178] Internal Displacement Monitoring Centre (IDMC), "Global Report on Internal Displacement 2023" (IDMC, 2023), https://www.internal-displacement.org/sites/default/files/publications/documents/IDMC_GRID_2023_Global_Report_on_Internal_Displacement_LR.pdf
[179] IDMC, "Global Report on Internal Displacement 2023."
[180] IDMC, "Global Report on Internal Displacement 2023."

In Southeast Asia, low-lying areas such as the Mekong and Red River deltas in Vietnam as well as the Irrawaddy River delta in Myanmar have been identified as being particularly vulnerable to sea-level rise and the associated storm surges.[181] According to the *2020 Version of the Climate Change Scenario* by Vietnam's Natural Resources and Environment Ministry, a 1m rise in sea level could leave almost half the Mekong Delta – the rice bowl of the region – flooded.[182] Considering that it is home to more than 17 million people, their potential displacement – and how to manage this potential future – is one of the most significant challenges for the region.

In the Mekong Delta, the increasing intrusion of salt water into once-fertile areas is significantly affecting crop yields. During the 2015–2016 drought in Vietnam, salt water intruded over 20–25km further inland than seasonal averages and an estimated 209,000ha of paddy rice crops were estimated to have been lost.[183] Whether or not directly due to the consequences of this drought, the local net migration considerably increased in Kiên Giang, one of the worst affected provinces, with around 1% of the population leaving.[184] Although this was labelled as the worst drought in a century, once-in-a-century events are occurring more often as a result of climate change. Once the ability to cope is outpaced by their insecurity, this may lead to a decision to migrate in search of better opportunities – as is already happening. The population of the Mekong delta area is shrinking overall, with nearly 1.1 million people having left since 2009.[185] In fact, compared to other regions in Vietnam, the Mekong Delta has the lowest immigration rate into the province and the highest migration rate out, making it the only region in the country with 0% population growth from 2009 to 2019.[186]

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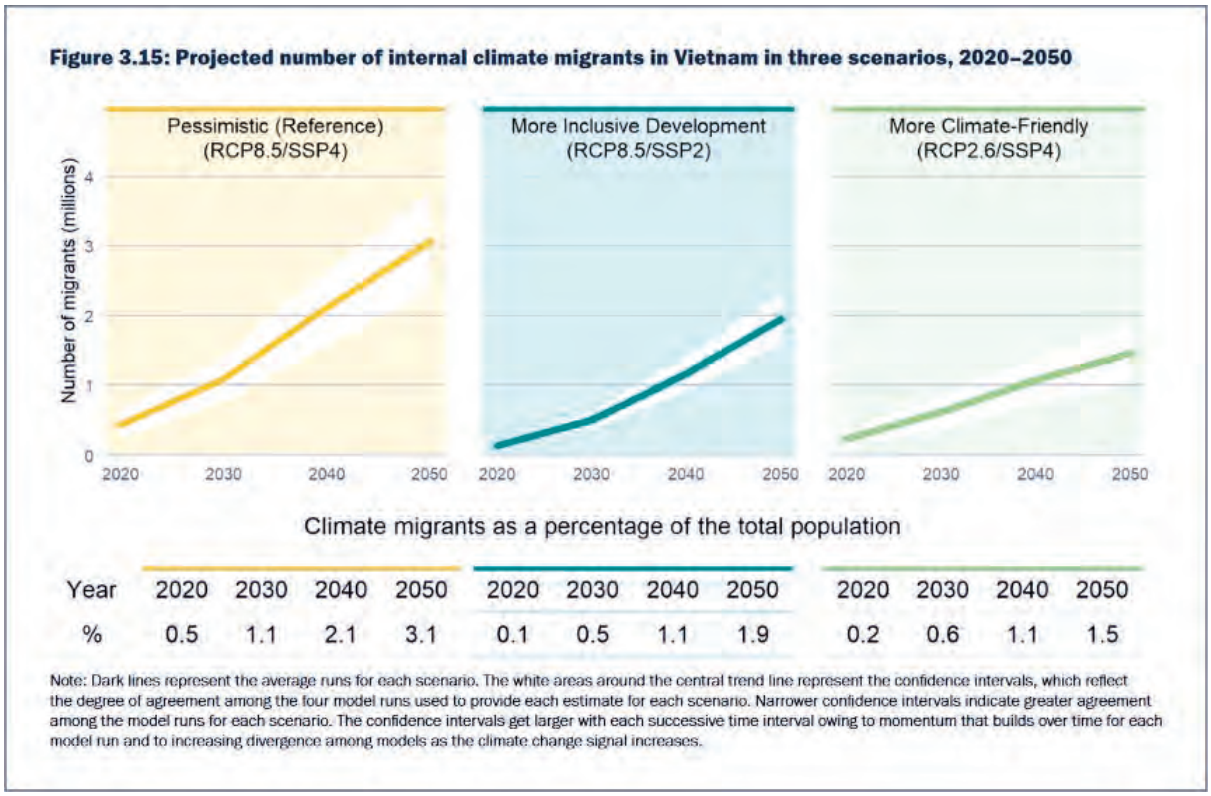
[181] ADB, "Addressing Climate Change and Migration in Asia and the Pacific" (Manila: ADB, 2012), https://www.adb.org/sites/default/files/publication/29662/addressing-climate-change-migration.pdf
[182] Minh Nga, "Half of Mekong Delta Permanently Submerged with 100cm Sea Level Rise", *VnExpress*, 22 January 2022, https://e.vnexpress.net/news/news/half-of-mekong-delta-permanently-submerged-with-100cm-sea-level-rise-4419358.html
[183] UN Country Team in Vietnam, "Vietnam Consolidated Report on Drought and Saltwater Intrusion Reporting Period: Oct 2015 – Mar 2016," 14 March 2016, https://reliefweb.int/report/viet-nam/vietnam-consolidated-report-drought-and-saltwater-intrusion-reporting-period-oct
[184] Alex Chapman and Van Pham Dang Tri, "Climate Change Is Triggering a Migrant Crisis in Vietnam," *The Conversation*, 9 January 2018, https://theconversation.com/climate-change-is-triggering-a-migrant-crisis-in-vietnam-88791
[185] Vu Thanh Tu Anh et al., "Annual Economic Report Mekong Delta 2020: Enhancing Competitiveness for Sustainable Development" (Vietnam Chamber of Commerce and Industry, 2020), https://fsppm.fulbright.edu.vn/download/BCKT-Mekong-Delta-Eng-Final.pdf
[186] Anh et al., "Annual Economic Report Mekong Delta 2020."

Figure 3.7 Climate migration in Vietnam under three scenarios (2020–2050)



Source: Viviane Clement et al., "Groundswell Part 2: Acting on Internal Climate Migration" (Washington, DC: World Bank, 2021), 127, https://openknowledge.worldbank.org/entities/publication/2c9150df-52c3-58ed-9075-d78ea56c3267

Vietnam is projected to see between 1.5 to 3.1 million internal climate migrants (1.5–3.1% of the country's population) by 2050 depending on the climate scenario being considered (Figure 3.7). Most of these migrants will go from low-lying regions such as the Mekong Delta and Ho Chi Minh City to regions such as Hanoi and the Red River Delta.[187] Other countries in Southeast Asia with low-lying areas such as the Philippines, Thailand and Indonesia are also grappling with the bleak prospect of sea-level rise and are likely to face similar internal migration challenges in the future climate landscape.[188]

If permanent migration to urban centres becomes increasingly common in the region, this could in turn lead to further stress on receiving cities. They could experience rapid growth of highly vulnerable urban communities living in informal settlements, many of which are in areas at high risk from extreme weather. If there is no careful and efficient management of the land, the increase in population density will stress land, water and food resources in a situation where climate change may already be affecting the

[187] Viviane Clement et al., "Groundswell Part 2: Acting on Internal Climate Migration" (Washington, DC: World Bank, 2021), https://openknowledge.worldbank.org/entities/publication/2c9150df-52c3-58ed-9075-d78ea56c3267
[188] Scott A. Kulp and Benjamin Strauss, "New Elevation Data Triple Estimates of Global Vulnerability to Sea-level Rise and Coastal Flooding," *Nature Communications* 10, no. 4844 (2019), https://doi.org/10.1038/s41467-019-12808-z

availability of such resources. In other words, there is a likelihood that the needs of migrants will outpace the hosting capacity of cities, particularly in terms of public infrastructure, livelihoods and housing. This may in turn serve as a potential pathway toward peace and security challenges. Specific studies would be needed to examine instances of rising economic and social tensions between host populations and migrant populations who are in competition over limited resources. Climate change, peace and security studies would be needed to determine how these socio-economic tensions will affect the political stability of Southeast Asian states in the long run.

3.8.2 Climate-induced displacement in conflict settings

Disasters are not the only driver of displacement in Southeast Asia. Conflicts play a part as well – as in Myanmar and the Philippines.

Table 3.6 Displacement due to armed conflicts and climate-induced events in the BARMM, Philippines

Events	Displaced Population
2013 Zamboanga siege	3,600
2017 armed violence in Sulu	2,110
2017 Marawi siege	80,300
2019 armed violence in Basilan	1,200
2019 earthquakes, Cotabato and Davao Del Sur	9,900
2020 monsoon rains and floods in several Mindanao provinces	420
2023 armed violence in Bukidnon	1,900
2023 earthquake, Davao De Oro	4,800
2023 armed violence in Maguindanao	900
2023 mid-year monsoon rains and floods in several Mindanao provinces	80,000

BARMM= Bangsamoro Autonomous Region in Muslim Mindanao
Source: United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), “Philippines: Mindanao Displacement Snapshot as of 20 July 2023,” ReliefWeb, posted 21 July 2023, https://reliefweb.int/report/philippines/philippines-mindanao-displacement-snapshot-20-july-2023

In the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), , climate change-induced events and conflicts have resulted in thousands of IDPs (Table 3.6). While the peace agreement between the Moro Islamic Liberation Front (MILF) and the Philippine government that established the BARMM has undeniably resulted in overall reduction in armed violence, there remain multiple, compounding threats – from violent extremist groups, *rido* (clan/family wars), political violence and climate-induced events (floods, landslides, typhoons) – that continue to cause displacement of populations.

An example is the plight of the IDPs in Marawi City who had originally been displaced in 2017 by the Marawi Siege. As of July 2023, approximately 80,300 people (16,070 families) remain in evacuation camps, exposed to the numerous natural hazards that

had struck the area in the intervening years.[189] In 2017, Typhoon Tembin inundated the towns hosting the IDPs, destroying several camps built on flood plains. These vulnerabilities were further intensified with the COVID-19 pandemic, leading to a humanitarian crisis for the IDPs.[190]

Myanmar's ongoing displacement crisis is a particularly complex humanitarian situation. As of end 2022, there were more than 1.4 million IDPs displaced as a result of conflict, the highest in Southeast Asia.[191] This number not only includes those affected by the 2021 military takeover in the country and the ensuing conflict, but also those who had been displaced by previous conflicts (including those between the Myanmar military and ethnic armed groups). In light of the intensity of the conflict and the widespread destruction of villages and homes, prospects for return are limited. In Kayah State, only 10% of those displaced since February 2021 had gone back to their homes as of October 2022.[192] The continuing destruction of homes and the increasing number of displaced people have only increased their vulnerability to disasters. This was clearly illustrated in the wake of Cyclone Mocha in March 2023. The cyclone caused widespread damage, with Rakhine State, which had already been severely affected by political violence in recent years and which is already home to hundreds of thousands of displaced people, being particularly affected.[193]

Although the ongoing conflict in Myanmar has little to do with climate change, the earlier Rohingya exodus in 2017 of an estimated 700,000 people provides a look at the end result of social tensions erupting into conflict – if the situation is not handled in its earlier stages.[194] Thus, although there is general agreement that there is currently no strong, direct correlation between climate change and conflict, the region needs to be proactive, and recognise that conflict can overlap and interact with climate change, at least exacerbating the *drivers* of conflict.[195] This being the case, climate change and conflict – both separately and together – can undermine livelihoods, hinder adaptation and weaken social cohesion. Increased conflict in which climate change plays a role,

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[189] United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), "Philippines: Mindanao Displacement Snapshot as of 20 July 2023." ReliefWeb, posted 21 July 2023. https://reliefweb.int/report/philippines/philippines-mindanao-displacement-snapshot-20-july-2023

[190] Maria Carmen Fernandez, Bai Shaima Baraguir, and John Bryant, "Inclusion and Exclusion in Displacement and Peacebuilding Responses in Mindanao, Philippines: Falling through the Cracks," HPG Working Paper, ODI, 2022, https://odi.org/en/publications/inclusion-and-exclusion-in-displacement-and-peacebuilding-responses-in-mindanao-philippines-falling-through-the-cracks/

[191] IDMC, "Global Report on Internal Displacement 2023."

[192] Market Analysis Unit (MAU), "Kayah/Karenni State IDPs – Household Survey (October 2022)", 2022, https://reliefweb.int/report/myanmar/market-analysis-unit-kayahkarenni-state-idps-household-survey-october-2022

[193] Helen Regan et al., "'The Water Took Them.' Myanmar Residents Describe Horror of Cyclone Mocha," *CNN*, 21 May 2023, https://edition.cnn.com/2023/05/20/asia/myanmar-cyclone-mocha-damage-interviews-intl-hnk/index.html

[194] IOM, "IOM Bangladesh: Rohingya Humanitarian Crisis Response Monthly Situation Report (December 2019)," 2019, https://www.iom.int/sites/default/files/situation_reports/file/iom_rohingya_crisis_response-external-sitrep-dec2019.pdf

[195] IPCC, "Climate Change 2022: Impacts, Adaptation and Vulnerability – Summary for Policymakers, Technical Summary and Frequently Asked Questions" (IPCC, 2022), https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryVolume.pdf

whether directly or indirectly, could therefore also aggravate displacement. In other words, climate change impacts could act as a threat multiplier, amplifying a person's existing vulnerabilities and therefore, magnifying their insecurities.

At the same time, it should be acknowledged that the link between climate change and mobility cannot be reduced to a simple, deterministic one. Rather than climate change being seen as the main cause behind a person's mobility choices, it should be understood as just one factor among many within the broader political, social and economic context – all of which play a part in the mobility decisions of those experiencing vulnerability.

3.8.3 Human trafficking

Hit by sudden-onset disasters and slow-onset climate change events, more people might be drawn to high-risk options.[196] They might turn to migrant smugglers in an effort to look for livelihood opportunities elsewhere, increasing their vulnerability to being trafficked or other related forms of exploitation and/or abuse. This could be particularly prevalent in regions that are already experiencing trafficking in persons, and where the infrastructure is already in place, such as in Southeast Asia. According to the 2023 Global Slavery Index, Myanmar has the highest estimated prevalence of modern slavery in Southeast Asia at 12.7% with Indonesia having the largest estimated number of people in modern slavery at over 1.8 million.[197]

Illegal, unreported and unregulated (IUU) fishing in particular has become one of the faces of trafficking in persons in the region. In 2015, most of the trafficking victims in the region were employed by the fishing sector.[198] This could likely be traced to the overfishing and depletion of fish stocks in the Gulf of Thailand in the 1990s, which resulted in fishing companies turning to longer-haul and IUU fishing, which led to a reliance on trafficked fishers from countries such as Cambodia and Myanmar.

In East Asia and the Pacific, 82% of the victims of trafficking in persons are from within the region itself.[199] This, combined with an 81% decrease in the number of cross-border trafficking cases detected in 2020, highlights the possible prevalence of domestic trafficking.[200] According to the *2022 Global Report on Trafficking in Persons*, victims who are domestically trafficked tend to be those who have participated in rural–urban migration.[201] This suggests an overlap between internal migration and exploitation patterns, which in turn may be linked to climate change and its impact on

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[196] IOM, "The Climate Change–Human Trafficking Nexus" (Bangkok: IOM, 2016), https://publications.iom.int/system/files/pdf/mecc_infosheet_climate_change_nexus.pdf
[197] It is important to note that obtaining accurate data is difficult as trafficking is under-reported. Walk Free, "Global Slavery Index 2023," 2023, https://www.walkfree.org/resources/
[198] IOM, "The Climate Change–Human Trafficking Nexus".
[199] United Nations Office on Drugs and Crime (UNODC), "Global Report on Trafficking in Persons 2022" (New York: UN, 2022), https://www.unodc.org/documents/data-and-analysis/glotip/2022/GLOTiP_2022_web.pdf
[200] UNODC, "Global Report on Trafficking in Persons 2022."
[201] UNODC, "Global Report on Trafficking in Persons 2022."

drivers of mobility.[202] Specifically, the absence of government support and/or institutional management following disasters or climate change-induced events contribute to the increased vulnerability of migrants to being exploited.

Armed conflicts and extreme weather events also have compounding impacts on trafficking in persons, with a proliferation in the cases of women and children becoming victims in times of climate-induced disasters.[203] In the Philippines, women are being pushed to migrate elsewhere to seek better employment opportunities that can help stabilise their family income and help them escape poverty. Among the Philippines' overseas workers, 64.1% are women. Of these women, about 44,000 are from the Bangsamoro region, and some 108,000 from other regions in Mindanao.[204] The BARMM has become one of the top sources of domestic and migrant workers, giving rise to concerns, particularly among Muslim Mindanao stakeholders, centred on comprehensive and human security issues such as gender-based violence, trafficking, forced labour and unfair labour practices.

Overall, human trafficking in Southeast Asia is increasingly recognised as an urgent issue, at the national as well as regional level. Thailand introduced the Measures in Prevention and Suppression of Trafficking in Women and Children Act (1997), while the Philippines passed the Anti-Trafficking in Persons Act (2003). ASEAN, for its part, has established mechanisms such as ASEAN Convention against Trafficking in Persons, especially Women and Children and the ASEAN Multi-sectoral Work Plan against Trafficking in Persons 2023–2028. Such measures have had notable success. As mentioned earlier, in 2020, cross-border trafficking appeared to have declined dramatically. However, there is still little work on the potential impacts of climate change on trafficking in persons, particularly in terms of examining and gathering more data on the climate change–migration–trafficking nexus.

[202] UNODC, "Global Report on Trafficking in Persons 2022."
[203] Mindanao Peoples Caucus, "Regional Dialogue: Linking Research and Policy-making," 28 March 2023, https://mindanaopeoplescaucus.org/2023/03/28/regional-dialogue-linking-research-and-policy-making/
[204] Bangsamoro Autonomous Region for Muslim Mindanao (BARMM), "Food Security and Nutrition Roadmap" (Cotabato City: Ministry of Agriculture, Fisheries and Agrarian Reform, October 2020), https://www.wfp.org/publications/food-security-and-nutrition-roadmap-bangsamoro-autonomous-region-muslim-mindanao

4. Climate Change and Political-Security Fault Lines in Southeast Asia

The countries of Southeast Asia have been able to maintain a cohesive, peaceful, stable and resilient region. Despite prevailing geo-political dynamics and flash points, the region has generally focused on promoting sustainable growth, peace and security, primarily through economic growth and development. Several countries in the region however have been grappling with protracted internal conflicts, resource competition and territorial disputes. With climate change, these security challenges could be aggravated, whether directly, though weather-related impacts overlaying those issues, and indirectly, from rising interest in hydropower and critical mineral resources generating or aggravating tensions.

The following provides an overview of the impacts of climate change on the areas affected by conflict or undergoing post-conflict transition in Southeast Asia. While the existing internal conflicts in the region are not caused by climate change, the convergence of climate change impacts and conflict could undermine the human security of IDPs and vulnerable communities, worsening the humanitarian challenges in the region, reducing development and undermining the capacity of communities to adapt. The compounding impacts of more frequent, overlapping climate-induced weather events and internal conflict could also put increasing strain on the institutional capacity of the relevant government agencies to respond.

4.1 Direct impacts of climate change

In the Philippines, Mindanao has experienced abnormal changes in rainfalls, increased frequency and intensity of typhoons, higher temperatures and prolonged drought – with major impact on agriculture. In the heart of the region, Liguasan Marsh of Maguindanao, fertile farmlands are occasionally inundated by floods while rich fishing grounds and rivers are seen to dry up.[205]

The southern island of Mindanao has historically been outside the typical path of the typhoons that bring havoc to northern and central Philippines due to its geographic location just below the typhoon belt. However, there has been a southward shift in the landfall of typhoons in the region, and they are increasing in frequency and intensity as well.[206]

At the same time, it has been projected that the southern Philippines would be at high risk of drought reoccurrence and lengthy heat waves.[207] Watersheds and major dams

[205] Fernandez et al., “Inclusion and Exclusion in Displacement and Peacebuilding Responses.”
[206] Giles et al., “Climate-resilient Agriculture in the Philippines.”
[207] Laurence L. Delina, “Climate-fragility Risks in the Philippine Bangsamoro” (paper presented to the *Second International Conference on Environmental Peacebuilding*, Switzerland, Online, 2–4 February 2022), https://hdl.handle.net/1783.1/116258

would be affected, with consequent effect on agricultural production, hydropower production and water security. In particular, the conflict-affected BARMM is projected to be drier than normal by 2050, with Maguindanao province likely to bear the brunt of the impacts. The agriculturally dependent communities in the area would be among the most vulnerable as they absorb the consequences of both these climate-induced shifts and also conflict. [208] Indeed, in recent years, Maguindanao has suffered more than any other province in Mindanao from lack of clean water, both in its urban areas and its agricultural communities.

Myanmar would see similar trajectories. Myanmar has been identified as one of the most vulnerable countries to the extreme weather events induced by climate change. Climate scenarios indicate that annual rainfall in the country would increase from 1,375 mm to 1,449 mm and 1,507 mm in 2021–2050 and 2051–2080, respectively.[209]

Climate change scenarios also anticipate a steady increase in water flows in Myanmar's major rivers, such as the Ayeyarwady River (Irrawaddy River); the largest river basin in the country, the Salween River basin; the Chindwin River; and the Sittaung River basin. These basins would be at risk of massive and frequent flooding episodes, displacing local communities and destroying agricultural farms. Frequent and intensified flood inundations could easily transform into a loss of yield and further aggravate food insecurity in Myanmar's conflict zones. In recent years, devastating floods have been the most common annual disaster in Myanmar.[210]

Concurrently with Myanmar's rainy months expected to be wetter and warmer, the dry season is projected to be drier and warmer. Temperatures are expected to increase by 1.1°C by 2040 and 2.7°C by 2070. After 2040, the central dry zone in the inland regions is expected to experience temperature increases of up to 3°C. This would mean that western and central parts of the Mandalay Region and the lower parts of the Sagaing and Magway Regions, which are all key agricultural regions, will have devastating droughts that could worsen food and economic insecurity for conflict-affected farming communities.[211]

In Indonesia, climate change is set to bring a 0.8°C increase by 2030, along with shifting rainfall patterns, resulting in earlier, shorter and more intense rain seasons, and likely leading to more frequent and intense wildfires.[212] Indonesia's conflict-prone Papua province had a loss of 30,952ha of forest due to wildfire in 2015.[213] This loss is

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[208] Delina, "Climate-fragility Risks in the Philippine Bangsamoro."
[209] Uttam Ghimire et al., "Assessment of Climate Change Impacts on the Water, Food, and Energy Sectors in Sittaung River Basin, Myanmar," *Water* 14, no. 21 (2022), https://doi.org/10.3390/w14213434
[210] Ghimire et al., "Assessment of Climate Change Impacts."
[211] Aung Tun Oo, Duncan Boughton, and Nilar Aung, "Climate Change Adaptation and the Agriculture–Food System in Myanmar," *Climate* 11, no. 6 (2023), https://doi.org/10.3390/cli11060124
[212] Nina Yulianti and Hiroshi Hayasaka, "Recent Active Fires in Indonesia's Southern Papua Province Caused by El Niño Conditions," *Remote Sensing* 15, no. 11, 2709 (2023): 2, https://doi.org/10.3390/rs15112709
[213] David Gaveau, "Drivers of Forest Loss in Papua and West Papua" (CIFOR, 2018).

significant as Papua is home to at least 30% of the country's remaining forest.[214] Local populations also had to contend with serious deterioration of air quality as the wildfires raged. Prolonged drought, causing crop failures and harvest losses, is another climate-related hardship.[215]

Warming temperatures have led to not just forest fires and extended dry seasons, but also a rise in sea level and torrential rains. The rapid melting of the Puncak Jaya tropical glaciers has been observed. According to a climate researcher at the Meteorology, Climatology, and Geophysical Agency (BMKG) of Indonesia, not much could be done to prevent the melting, which could disrupt the regional ecosystem in Papua and cause a rise in the global sea level within a decade.[216]

4.2 Impacts on conflict-affected communities and displaced people

While climate change events are not the cause of the internal conflicts in the region, an indirect relationship between climate change and conflict can be established: extreme weather events can overlay armed conflicts, affecting communities and IDPs. Drivers of armed conflicts may also interact with or be worsened by the effects of climate change. As shown in section 3.8 on climate change and forced migration, IDPs have, as a result of internal conflicts in Mindanao and Myanmar, been severely affected by extreme weather events hitting their host communities.

In the context of Mindanao, local experts see no direct relationship between rebellion and climate change.[217] Existing conflicts, particularly *rido* and extremism, are not caused by climate change. Nevertheless, climate change is indeed a threat to conflict-affected minority communities (both Moro and non-Moro ethnic groups).[218] The rise in extreme weather events is causing population displacement, agricultural havoc and changes in flooding patterns across the Muslim Mindanao region.

Severe Tropical Storm Nalgae in 2022 illustrates the impact of climate-related changes on Muslim Mindanao. As noted earlier, a southward shift in typhoon landfall has led to more severe weather events being seen and expected in the region. This is indeed what happened with Nalgae. The massive outer bands of the typhoon dumped above-average rainfall on the BARMM. The heavy rains caused flash floods and landslides, leading to multiple deaths and infrastructure damage, with conflict-affected Maguindanao province among the worst-hit (see Table 4.1).[219]

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[214] Yulianti and Hayasaka, "Recent Active Fires," 2.
[215] Manuel Boissiere et al., "Local Perceptions of Climate Variability and Change in Tropical Forests of Papua, Indonesia," *Ecology and Society* 18, no. 4, 13 (2013): 6, https://doi.org/10.5751/ES-05822-180413
[216] Rebecca Ratcliffe, "Indonesia's Tropical Eternity Glaciers Could Vanish within Years, Experts Say," *Guardian,* 25 August 2023.
[217] Consultation with local experts, Zoom, 26 July 2023.
[218] Fernandez et al., "Inclusion and Exclusion in Displacement and Peacebuilding Responses."
[219] Ferdinandh B. Cabrera, "'Paeng' Leaves at least 67 Dead in Maguindanao," *Mindanews,* 29 October 2022, https://www.mindanews.com/top-stories/2022/10/paeng-leaves-at-least-67-dead-in-maguindanao/

While the residents of Maguindanao had experienced flooding in the past, and had developed a level of adaptive capacity, they were still caught off guard. Surging floodwaters from the mountains inundated their communities, destroyed their houses and flattened their farmlands. In Maguindanao, such unprecedented scale of damage occurred against a backdrop of communities already exposed to decades of conflict, from the Moro rebellion and Philippine military operations to political violence and *rido* (armed disputes between warring families or clans) – and who are still recovering from the lingering impacts. The high incidence of poverty, at 38%, further compounds the situation in Maguindanao, as impoverished families (both Moro and non-Moro ethnic groups) will find it more difficult to cope with the effects of continued armed fighting and climate change.[220]

Table 4.1 Typhoon Nalgae's impacts in the Bangsamoro Muslim Mindanao region's conflict areas

Effects (October–November 2022)	Key figures
No. of houses destroyed and partially damaged	7,040 houses
Cost of damage to agriculture	USD 48.6 million
Displaced population	467,350 people
Casualties	61 deaths

Source: United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), "Consolidated Rapid Assessment Report: Severe Tropical Storm Nalgae (Paeng), Mindanao, Philippines," 7 November 2022, https://www.unocha.org/publications/report/philippines/philippines-severe-tropical-storm-nalgae-paeng-mindanao-consolidated-rapid-assessment-report-7-november-2022

These extreme events do not just cause displacement of people, they also disproportionately affect people displaced previously by smaller seasonal weather events such as monsoon rains, storms and floods, and from attacks by extremist groups, rido and land dispossession of non-Moro Indigenous peoples.[221]

These IDPs, who are already affected by climate and conflict impacts, may face discrimination from host communities and within IDP camps in the BARMM based on their ethnicity and religious identities, which could affect their access to humanitarian aid, shelter and basic amenities. This not only increases their insecurity, but could also erupt into tensions, though in this case, local peace experts suggest that existing mediation and conflict prevention mechanisms at the local level have for now lessened the potential of these tensions to drive armed violence.[222]

Conflict-affected communities in the Mindanao provinces may also face food security and economic security impacts when severe weather events hit, with farmers and fisherfolk being particularly vulnerable. In 2016, the region suffered the most extreme

[220] FAO, "Bangsamoro Women and Youth Rising from Floods and Conflicts," 8 May 2023, https://www.fao.org/philippines/news/detail/zh/c/1641682/
[221] Fernandez et al., "Inclusion and Exclusion in Displacement and Peacebuilding Responses."
[222] Fernandez et al., "Inclusion and Exclusion in Displacement and Peacebuilding Responses."

El Niño (heatwave and prolonged drought) yet. Crops were destroyed, with many provinces declaring a state of calamity. An estimated 200,000 farmers and 17,000ha of farmlands were affected, with an estimated USD 81 million of losses in agricultural production.[223] In Myanmar, in the conflict-affected Sittaung River basin, vulnerable communities are doubly exposed to climate change events and armed conflicts, generating compounding impact on them. Repeated floods have displaced tens of thousands of people from their villages.[224] And, in 2023, the communities in the river basin's Bago region further suffered from a marked acceleration of fighting between the military and the Karen National Union working with the Bago Region People's Defence Force.[225]

The 2023 Cyclone Mocha is the latest manifestation of the dire climate threat facing Myanmar's vulnerable communities, who are already hard-hit by decades of armed conflict, military rule and deprivation of basic government services. Understandably, decades of armed conflicts have essentially eroded the capacity of communities to be prepared for and adapt to extreme weather events.

In May 2023, Cyclone Mocha, a Category Five storm, struck the coastal areas along the Myanmar–Bangladesh border. The heavy rains and strong winds triggered landslides, as well as damage and destruction to homes and facilities in all 33 Rohingya refugee camps in Cox's Bazar and neighbouring Bangladeshi communities (see Table 4.2). They also were unable to access clean drinking water as well as other facilities for education, nutrition, and protection.[226]

Table 4.2 Cyclone Mocha's impact on Rakhine State and Rohingya refugee camps

Effects	Key figures
Agricultural land destroyed	1,599 ha
Cost of damage to agriculture	USD 99 million
Cost of damage to infrastructure	USD 294 million
Displaced population	18,800 people
Number of people affected in Rakhine and Sagaing	1.2 million people
Number of people affected in Cox's Bazar refugee camp and Bhasan Char Island	960,128 people

Source: Global Facility for Disaster Reduction and Recovery (GFDRR) and World Bank, "Extremely Severe Cyclonic Storm Mocha, May 2023, Myanmar: Global Rapid Post-Disaster Damage Estimation (GRADE) Report, 29 June 2023" (Washington, DC: World Bank, 2023), https://thedocs.worldbank.org/en/doc/d547c7dcb949a8b07aea2cc2e66a7bbc-0070062023/original/GRADE-

[223] Bella Cariaso, "El Niño to Affect Rice Production – DA." *Philippine Star,* 10 August 2023, https://www.philstar.com/headlines/2023/04/10/2257778/el-nio-affect-rice-production-da; Giles et al., "Climate-Resilient Agriculture in the Philippines."
[224] Ghimire et al., "Assessment of Climate Change Impacts."
[225] Morgan Michaels, "Fighting Rages along Myanmar's Transport Routes," IISS Myanmar Conflict Map, September 2023, https://myanmar.iiss.org/updates/2023-09
[226] Inter Sector Coordination Group (ISCG), "Cyclone Mocha Flash Appeal: Bangladesh (May–December 2023), " ReliefWeb, posted 1 June 2023, https://reliefweb.int/report/bangladesh/cyclone-mocha-flash-appeal-bangladesh-may-december-2023; CycloneMochaMay23Myanmar.pdf; United Nations Population Fund (UNFPA) Bangladesh, "Situation Report, Cyclone Mocha," May 2023, https://bangladesh.unfpa.org/en/publications/situation-report-cyclone-mocha-may- 2023?_ga=2.182372711.1106953909.1696322030-1204352700.1696322030

Meanwhile, conflict-afflicted Papuan communities are confronting another human security issue: their displacement caused by extreme weather events. In 2019, extreme rainfall and flash floods had had a devastating impact on residents living in the highlands of Papua province. The Indonesian agency BMKG documented at least 50 deaths, along with the injuries and the displacement of thousands of residents from the peak of Cyclops Mountains where rainfall intensity was notably more intense than usual.[227]

In the districts of Agandugume and Lambewi in Puncak Regency, the Indonesian National Agency for Disaster Countermeasure (BNPB) has recorded the displacement of 6,000 individuals as a result of extreme cold weather and prolonged drought in Papua's highland communities.[228] In other regencies, the heat wave and drought have caused significant health issues for Papuans as well as the depletion of fish and prawns, their primary protein source.[229] Moreover, groundwater has been contaminated with sea water, rendering the water unfit for consumption.[230]

Floods also pose a significant threat to communities in Papua's coastal communities.[231] In the recent 2022 flooding in Sorong city, three individuals lost their lives, around 2,500 were internally displaced and 1,025 home were rendered uninhabitable.[232]

4.3 Governance and capacity constraints

The newly minted BARMM regional government in Mindanao has recognised the need to come up with a clear policy framework addressing the creeping impact of climate change on vulnerable sectors and in post-conflict communities. In fact, the government included climate change adaptation in its 12-point priority agenda for 2023–2025. Lawmakers are currently deliberating a bill creating the Bangsamoro Climate Change Commission, which will institutionalise policies, initiatives, plans and programmes dedicated to addressing the concerns of climate change. The Commission will seek and execute initiatives safeguarding vulnerable communities from the impacts of

[227] "Banjir Sentani, Papua: Curah Hujan Masih Tinggi, Waspadai Banjir Susulan [Rainfall is still intense, beware of subsequent floods]," *BBC Indonesia*, 18 March 2019.
[228] "BNPB: 6 Ribu Orang Mengungsi Imbas Cuaca Ekstrem Papua Tengah [6 Thousand People Flee Due to Extreme Weather in Central Papua]," *CNN Indonesia*, 1 August 2023.
[229] Boissiere et al., "Local Perceptions of Climate Variability and Change," 6.
[230] Boissiere et al., "Local Perceptions of Climate Variability and Change."
[231] Fabio Maria Lopes Costa, "Banjir Terjang Nabire, Ratusan Rumah Terendam dan Satu Jembatan Rusak [Floods hit Nabire, hundreds of houses submerged and one bridge damaged]," *Kompas,* 20 November 2022.
[232] ECHO, "Indonesia – Floods and Landslides (BMPB, BMKG) (ECHO Daily Flash of 25 August 2022)," ReliefWeb, posted 25 August 2022, https://reliefweb.int/report/indonesia/indonesia-floods-and-landslides-bmpb-bmkg-echo-daily-flash-25-august-2022

climate change.[233] The regional government also seeks to address climate change and promote adaptation by strict enforcement of existing legal frameworks on environmental and natural resources protection.[234]

But there are key challenges for the BARMM government in responding to the multiple crises brough about by armed violence, post-conflict transition and extreme weather events. Its limited fiscal and logistical resources have undermined its capability to simultaneously prepare for and respond to the multiple climate change, peace and security threats. As climate change intensifies in Mindanao – to the level of an emergency – many of the decades-old drivers of conflict can resurface in the Bangsamoro region at the same time as the emergence of new drivers. Studies will therefore be needed to have a deeper and broader comprehension of the emerging linkages between violent extremism, conflicts, communal tensions and climate change impacts in the BARMM.

According to local experts, existing conflict drivers and climate change impacts being experienced now by Muslim Mindanao communities both erode or slow down the capacity of locals to adapt to emerging climate change-induced events.[235] Even local government officials admitted that the destruction caused by Severe Tropical Storm Nalgae was something first responders and Bangsamoro communities had never seen before.[236] Fatal flash floods had caught communities and even local government officials unprepared as they were not accustomed to strong storms, particularly since their capacity was already stretched from having to deal with the post-conflict transition after decades of internal conflict. The short-term benefits of the Bangsamoro peace agreement can be easily jeopardised unless climate change and conflict effects are tackled together.

Myanmar confronts a number of obstacles in integrating climate policies with initiatives on conflict prevention/resolution. A major constraint is lack of institutional capacity. Its capacity to implement and enforce climate policies is limited, owing primarily to the lack of expertise and skilled personnel.

Lack of infrastructure (e.g., electricity supply and roads) and financial and technical resources (i.e., weak public financial management and underinvestment in education and capacity development) are also major factors. Because Myanmar has limited financial resources, it must rely heavily on external funding to implement and enforce its climate policies. Such external aid has now been suspended due to sanctions

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[233] Bangsamoro Parliament, "BARMM Lawmakers Propose Establishment of Climate Change Commission," Bangsamoro Transition Authority, 19 September 2023, https://parliament.bangsamoro.gov.ph/2023/09/19/barmm-lawmakers-propose-establishment-of-climate-change-commission/.
[234] Bangsamoro Parliament, "BARMM Lawmakers."
[235] Technical consultation, Zoom, 26 July 2023.
[236] Merlyn Manos, "Desperation Creeps in Paeng-devastated Maguindanao del Norte," *Rappler*, 1 November 2022, https://www.rappler.com/nation/mindanao/desperation-severe-tropical-storm-paeng-devastation-maguindanao-del-norte/; Mindanao Peoples Caucus, "Regional Dialogue."

imposed by donor countries after the 2021 military coup. The politicisation of humanitarian aid by the military regime has also worsened climate, peace and security risks in Myanmar. In Rakhine State, Cyclone Mocha left approximately 1.5 million people in urgent need of humanitarian aid. However, the military junta blocked the delivery of international humanitarian aid. According to a Myanmar expert, the politicisation of Cyclone Mocha exacerbated the humanitarian crisis in Rakhine, for those displaced by the armed violence in past years as well as by the 2021 military coup.[237]

Another constraint is lack of coordination and cooperation among various ministries. In the absence of effective inter-ministerial coordination, policies may lack coherence, impeding the achievement of climate goals.

Yet another barrier to integrating climate policies in Myanmar is political instability due to decades of military rule, coups and armed conflicts. Weak and ineffective governance is a significant impediment to Myanmar's implementation of climate policies. The country's policy implementation mechanism is weak, and it lacks the necessary legal and regulatory frameworks to support climate policy implementation. The country's history of political instability, combined with the ongoing conflict, makes maintaining continuity and consistency in policy implementation difficult. This instability may result in a lack of political will to prioritise climate policies, undermining planned climate actions and jeopardising the country's ability to meet its climate goals.[238]

4.4 Hydropower projects in Myanmar

For Myanmar, hydropower is the key to the country's clean energy transition, climate change mitigation strategy and energy security. The Nationally Determined Contribution (NDC) of Myanmar aims to mitigate the country's emissions by 40% (using 2018 as the baseline) and includes expanding renewable energy as a major climate policy action and an energy security initiative.[239] However, controversial hydropower projects in Myanmar are a climate, peace and security issue. The race to adapt to the impacts of climate change has driven a resurgence in new hydropower projects in the country. More than 60% of Myanmar's electricity supply is generated by hydropower dams.[240]

Dam projects in Myanmar's conflict zones have been viewed as another example of climate maladaptation. The Irrawaddy River and Salween River have huge

[237] Kyaw Hsan Hlaing, "Responses to Humanitarian Needs in Western Myanmar after Cyclone Mocha," ISEAS Perspective 72, 15 September 2023, https://www.iseas.edu.sg/wp-content/uploads/2023/08/ISEAS_Perspective_2023_72.pdf
[238] Oo et al., "Climate Change Adaptation and the Agriculture–Food System."
[239] Republic of the Union of Myanmar, "Nationally Determined Contributions," July 2021, https://unfccc.int/sites/default/files/NDC/2022-06/Myanmar%20Updated%20%20NDC%20July%202021.pdf
[240] Ministry of Electricity and Energy, Myanmar, "Energy Supply Security Study for Myanmar," ERIA Research Project Report FY2020 no. 11, October 2020, https://www.eria.org/uploads/media/Research-Project-Report/2020-11-Energy-Supply-Security-Study/Energy-Supply-Security-Study-for-Myanmar.pdf

hydropower potential but their basins are also home to many ethnic groups which have been in conflict with the military and central government. While hydropower dams can supply zero-carbon electricity, a majority of dam projects have been tainted by human rights violations such as land grabs and forced displacement of ethnic minority groups, despite their resistance.

From the perspective of affected communities, the projects do not provide them with any benefits and the only ones profiting are the military regime and the neigbouring countries involved, complicating the relationship between the central government and military and the affected ethnic groups. Yet the military regime would likely continue with these controversial projects, given Myanmar's domestic energy challenges; its need for sources of foreign revenues to mitigate the impact of Western sanctions; and the growing demand from neighbouring countries for zero-carbon power sources. As expected, constructing mega-dams that displace ethnic minorities and inundate their traditional lands exacerbates existing conflicts and insecurity.

One such project is the Chinese-funded Myitsone Dam. The project had been suspended by then-President Thein Sein in 2011 due to strong local opposition around the impact on local ethnic communities, particularly their displacement from their ancestral lands. But, for the affected communities, the government's response was a little too late, as preparatory works in 2009 had already resulted in the displacement of approximately 12,000 people.[241] It had also exacerbated existing armed conflict in the Kachin region as it had fuelled existing grievances and vulnerabilities of the Kachins.[242] There are now renewed fears that the junta will revive the project, with the intention to export 90% of the electricity generated to China while Myanmar would earn USD 500 million annually.[243]

The Myitsone Dam project is not an isolated case (Box 4.1). The dams planned for the Salween River also faced strong resistance from ethnic communities, as the dams would inundate land that is home to villagers displaced by conflicts in the late 1990s, who have been unable to return to their homelands. The Tanintharyi River is another important river located in southern Myanmar where mega-dams have been proposed. These plans have also been controversial as the river is the lifeblood of ethnic

[241] Tira Foran et al., "Large Hydropower and Legitimacy: A Policy Regime Analysis, Applied to Myanmar," *Energy Policy* 110 (2017), https://doi.org/10.1016/j.enpol.2017.08.043; Debby Sze Wan Chan, "Asymmetric Bargaining between Myanmar and China in the Myitsone Dam Controversy: Social Opposition akin to David Stone against Goliath," *The Pacific Review* 30, no. 5 (2017), https://www.tandfonline.com/doi/abs/10.1080/09512748.2017.1293714

[242] Laur Kiik, "Confluences amid Conflict: How Resisting China's Myitsone Dam Project Linked Kachin and Bamar Nationalisms in War-torn Burma," *Journal of Burma Studies* 24, no. 2 (2020), https://doi.org/10.1353/jbs.2020.0010

[243] International Rivers, "Independent Expert Review of the Myitsone Dam EIA," 30 September 2013. https://archive.internationalrivers.org/resources/independent-expert-review-of-the-myitsone-dam-eia-8129

communities throughout the region, who rely on the river and its tributaries for food, water and transportation.[244]

Box 4.1 Hydropower plans for the Salween River and Tanintharyi River

The intended recipients of the hydro-generated electricity from the Salween River and Tanintharyi River are Myanmar's neighbouring countries. But the specific impacts in Myanmar's conflict-prone regions would include population displacement, confiscation of land and property, massive loss of fish species and stock, contamination of water sources, and alterations to river flows and the downstream ecosystem.

Salween River

The Hatgyi and Mong Ton dams are among the largest of seven mainstream dam projects being planned. The Mong Ton Dam project alone would displace at least 60,000 people, primarily those living in the conflict-prone Shan and Karen states.

Tanintharyi River

A proposed 1,040MW hydropower dam planned by the Thai-owned Greater Mekong Subregion Power Public Co. Ltd., will inundate a vast area of 585 sq km covering ancestral lands and affecting 76 ethnic groups and conflict-affected communities. The project will displace almost 7,000 people, primarily from the Karen ethnic group.

Source: Tyler Roney et al., "China's Salween Plans in Limbo in Post-coup Myanmar," *The Third Pole,* 8 June 2021, https://www.thethirdpole.net/en/energy/chinas-salween-plans-in-limbo-in-post-coup-myanmar/; Candle Light Youth Group, Southern Youth, and Tarkapaw Youth Group, "Blocking a Bloodline: Indigenous Communities in Tanintharyi Fear Plans to Dam the Tanintharyi River" (August 2019), https://progressivevoicemyanmar.org/wp-content/uploads/2019/08/Blocking-a-Bloodline-Layout-Final_V4-_-Arial-1.pdf

[244] Tyler Roney et al., "China's Salween Plans in Limbo in Post-coup Myanmar," *The Third Pole,* 8 June 2021, https://www.thethirdpole.net/en/energy/chinas-salween-plans-in-limbo-in-post-coup-myanmar/; Candle Light Youth Group, Southern Youth, and Tarkapaw Youth Group, "Blocking a Bloodline: Indigenous Communities in Tanintharyi Fear Plans to Dam the Tanintharyi River" (August 2019), https://progressivevoicemyanmar.org/wp-content/uploads/2019/08/Blocking-a-Bloodline-Layout-Final_V4-_-Arial-1.pdf; Moe Aung Myat, "Tanintharyi Dam Project Draws Local Ire," *Myanmar Times,* 14 August 2019, https://www.mmtimes.com/news/tanintharyi-dam-project-draws-local-ire.html

5. Climate Change and Geo-political Dynamics in Southeast Asia and the Wider Region

5.1 Mekong River Sub-region

Climate change is indeed no longer just an emerging threat in the Mekong River basin. Its impact is in the present and affecting the livelihoods of the millions who rely on the river's natural resources. As discussed in section 3.4 on water security, climate change is an existential threat to the Mekong Delta, exacerbating the negative consequences of hydropower dams. The operation of massive upstream dams has resulted in the decline of water flow, according to scientists and environmentalists. The lack of sediment would be felt severely in future when all mega-dams being built by China and Lao PDR are completed. Local experts consulted for this report have indicated that inadequate water flow to the agricultural plains of the Mekong Delta means decreasing level of soil fertility.[245] This has severely affected agricultural productivity in the delta, illustrating the negative, compounding consequences of both hydropower dams and climate change effects. The Lower Mekong Basin, which includes parts of Cambodia, Lao PDR, Thailand and Vietnam, is recognised as among of the areas in Southeast Asia most vulnerable to climate change (section 3.4). The economies of the Lower Mekong Basin countries, their ecosystems, sustainability and social harmony are all at risk.

Until around 15 years ago, the Mekong, one of the world's longest rivers, used to carry 143 million tons of sediment to the delta every year, but by 2020 only about a third of that was reaching the flood plains in Vietnam. The reduced volume of sediment and water from the upstream part of the Mekong River has significantly affected the agricultural productivity of the Mekong Delta. The delta, the ''rice bowl'' and aquaculture hub of Vietnam, is also among the world's three most vulnerable deltas. The complex threats to the Mekong Delta in Vietnam and their implications cannot be underestimated as this rice bowl serves to guarantee food security for the whole country and beyond, accounting for 50% of its rice output, 80% of its rice exports and 70% of its fisheries produce – but, productivity in the delta has been decreasing.[246] Climate change has also amplified the livelihood vulnerability of rice farmers in the Mekong Delta. While farmers have been trying to adapt to the Mekong's environmental pressures and climate change, their rice cultivation practices and production methods are untenable as these also deplete the soil, exacerbating the impacts on the Mekong River. Both climate change and environmental pressures undermine the farmers' adaptive capacity and livelihood sustainability.[247]

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[245] Technical consultation, Hanoi, Vietnam, 24-26 September 2023.
[246] Hoang Nam, Thu Hang, and Ngoc Tai, "Erosion Puts Mekong Delta Future in Doubt," *VnExpress,* 6 September 2023, https://e.vnexpress.net/news/news/environment/erosion-puts-mekong-delta-future-in-doubt-4649603.html; Dung Duc Tran et al., "Climate Change Impacts on Rice-based Livelihood Vulnerability in the Lower Vietnamese Mekong Delta: Empirical Evidence from Can Tho City and Tra Vinh Province," *Environmental Technology & Innovation* 28, 102834 (2022), https://dx.doi.org/10.1016/j.eti.2022.102834
[247] Tran et al., "Climate Change Impacts on Rice-based Livelihood Vulnerability."

Local experts have pointed out that communities in the Mekong Delta could experience societal tensions as resources for farming and fishing communities dwindle due to the impact of climate change.[248] Tensions over uneven access to irrigation and drinking water, for instance, need to be monitored and mitigated. Nevertheless, mediation mechanisms at the local level can, for now, manage the competing interests and needs of various communities and groups, through strong partnerships with and the participation of grassroots leaders, local officials and community leaders. While the situation has yet to escalate into a full-blown peace and security threat, a study would be needed to have a deeper understanding of potential sources of conflict among resource users in the climate change-affected Mekong Delta communities.

Tensions could also arise from the unintended consequences on riverine communities and downstream states as various countries construct hydropower dams across the Mekong River (see section 3.4). Such hydro projects have become one of the sources of tensions between China and some Southeast Asian countries.[249] Analysts and experts have begun to describe the Mekong River as a potential geo-political security flashpoint, deeming this an area that could spark regional tensions and derail inter-state relations. While these tensions have yet to result in armed conflict over the Mekong River, it is important analyse how existing frameworks such as the MRC can help foster cooperation in addressing climate change impacts in the Mekong Sub-region, including potential peace and security linkages.

Mekong countries pursue various forms of cooperation in sustainable development and water resource management in Mekong subregional forums such as the Mekong River Commission and the Ayeyawady–Chao Phraya–Mekong Economic Cooperation Strategy.[250] But a major challenge ahead is how to close the gap in their diverse, occasionally competing interests with regard to transboundary water management in the Mekong River Basin. [251] The management of the construction of hydropower dam and transboundary water in the Mekong River remains complicated for Mekong countries. There are also challenges to the effectiveness of the MRC, not least of which is the absence of China, and the existence of the China-led Lancang–Mekong Cooperation as a competing forum. But MRC remains important in fostering cooperation among the Mekong countries of Southeast Asia. For MRC member countries, it is important to assess the human security impact of these hydropower

[248] Technical consultation, Hanoi, Vietnam, 24-26 September 2023.
[249] Hongzhou Zhang and Li Mingjiang. "China's Water Diplomacy in the Mekong: A Paradigm Shift and the Role of Yunnan Provincial Government." *Water International* 45, no. 4 (2020), https://doi.org/10.1080/02508060.2020.1762369
[250] Phan Xuan Dung, "Vietnam's Response to China's Growing Dominance in the Mekong: A Quest for Harmonious Coexistence," in *The Displaced: Disrupted Trade, Labour and Politics in the Mekong River Basin,* ed. Brahma Chellaney and Frederick Kliem (Tokyo: Konrad-Adenauer-Stiftung Japan Office, 2021).
[251] Truong-Minh Vu and Tram Nguyen, "'Adapting to Nature': A Preliminary Assessment of Vietnam's Mekong Water Diplomacy since 2017," ISEAS Perspective 166, 17 December 2021, https://www.iseas.edu.sg/wp-content/uploads/2021/11/ISEAS_Perspective_2021_166.pdf

projects and climate change, particularly on how these may interact with the existing vulnerabilities of local communities relying on the river and its tributaries.

The MRC has conducted a number of basin-wide studies to assess the impacts of climate change in the Lower Mekong Basin. It has produced basin-wide strategies such as the Mekong Climate Change Adaptation Strategy and Action Plan, which sets out the strategic priorities and actions at basin level to address climate change risks and strengthen basin-wide resilience. To ensure systematic implementation of these strategies, there are technical guidelines that seek to help member countries ensure that climate change adaptation is harmonised with effective strategies and plans at various levels, and that the monitoring and reporting system on climate change is operationalised. Furthermore, scientific assessments and studies are regularly conducted by MRC to closely monitor the effects of climate change on the river and dependent communities.[252]

While the MRC has been able to mainstream the shared issue of climate change in the Mekong Sub-region through its baseline studies and technical projects, further studies would be needed to establish peace and security issues that may emerge in the future due to social tensions and upstream-downstream dynamics.

5.2 Illegal, unreported and unregulated fishing in the South China Sea

The interaction of the problem of declining resources with the impact of climate change seen in the Mekong Sub-region has parallels in the South China Sea. In fact, another source of regional geo-political insecurity in Southeast Asia is declining fish stocks, including in the disputed South China Sea. Two key challenges tied with this issue is the protracted problem of illegal, unreported and unregulated (IUU) fishing and the worsening impact of climate change on the seas.

The South China Sea is one of the world's top five most productive fishing zones, contributing about 16.6 million tons of fish or 12% of the global fish catch annually.[253] However, according to the South China Sea Expert Group of the CSIS-Asia Maritime Transparency Initiative, "the South China Sea is teetering on the edge of a fisheries collapse, and the only way to avoid it is through multilateral cooperation in disputed waters".[254] Its rich fishery resources are being depleted at an alarming rate as fish stocks have declined by 66-75 percent over the past two decades.[255]

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[252] MRC, "Climate Change."
[253] Kristi Govella, "Avoiding and Exploiting the Tragedy of the Commons: Fishing, Crime, and Conflict in the South China Sea," *International Politics* (2023), https://doi.org/10.1057/s41311-023-00501-4
[254] CSIS South China Sea Expert Working Group, "A Blueprint for Fisheries Management and Environmental Cooperation in the South China Sea," Asia Maritime Transparency Initiative, 13 September 2017, https://amti.csis.org/coc-blueprint-fisheries-environment/
[255] CSIS South China Sea Expert Working Group, "A Blueprint for Fisheries Management."

5.2.1 Will climate change worsen IUU fishing in the South China Sea?

Fish move freely across maritime boundaries, and overfishing can deplete the number of fish available to others. In the South China Sea, in particular, most fishery resources are either shared stocks that migrate across the EEZs of multiple states or they are highly migratory species such as tuna. Overfishing or regulatory changes within one country's borders inevitably affect other countries. Consequently, it is impossible for states to prevent the depletion of fish stocks without joint management and regulation.

In addition to their importance for export, the fishery products of the South China Sea play a critical role in regional food security, helping to ensure that people have physical and economic access to basic sustenance. For instance, nearly 40% of the animal protein supply in the Philippines comes from fish and seafood, 30% for Vietnam, and over 50% for Indonesia. The consumption of seafood is projected to grow, as more countries in the region are reaching middle-income levels.[256]

One study has found that animal and plant species have been moving away from the Equator at around 20cm per hour in the last 40 years, and they are projected to continue doing so until at least the end of this century.[257] Several marine species appear to be exhibiting similar behaviour. Rising ocean temperatures, which means warmer waters in the tropics, including the South China Sea, are driving fish to abandon their historic territories and migrate to temperate and cooler waters. In tropical waters, subtropical fish species have already decreased significantly, following a change in average sea surface temperatures between 1970 and 2000.[258] With a projected continuous rise in temperature, even the typically tropical or warm-water fish species are moving to temperate zones. The climate change impacts on fish stock in tropical waters can be illustrated further in the projected change in catch potential. Climate change impacts could fall unevenly across the South China Sea. One study predicts that between 2005 and 2055, some areas in the South China Sea would lose 5% to 16% in terms of maximum catch potential, while others would experience increase of up to 16% to 30%.[259]

Fish stocks in the South China Sea could also be affected by the impact of climate change on coral reefs. Warming sea surface temperatures and ocean acidification have affected coral reefs in the South China Sea since the early 1980s. In 2015, Dongsha Atoll in the northern part of the South China Sea saw 40% of its corals

[256] FAO, "FAO Fisheries and Aquaculture – Fishery and Aquaculture Country Profiles," 2020, accessed 8 November 2023, https://www.fao.org/fishery/en/facp/search
[257] Jim Daley, "Ocean Species Are Shifting toward the Poles," *Scientific American*, 27 March 2020, https://www.scientificamerican.com/article/ocean-species-are-shifting-toward-the-poles/
[258] William W.L. Cheung et al., "Large-scale Redistribution of Maximum Fisheries Catch Potential in the Global Ocean under Climate Change', *Global Change Biology* 16, no. 1 (2010), https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2486.2009.01995.x
[259] Cheung et al., "Large-scale Redistribution of Maximum Fisheries Catch Potential."

bleached due to a 2^0C sea surface temperature rise during an El Niño event, a mass coral bleaching phenomenon unseen in the last 40 years.[260]

Marine environmental degradation could present serious security threats for the region considering the importance of the South China Sea for the well-being of people living in the region's littoral states. Deterioration of marine environments, induced by human activities and climate change, causes economic, food, health and environmental insecurities for communities that depend on the seas for survival. Coral reef fish, seagrass and mangroves are sources of food for more than 100 million people in Southeast Asia and losing them may result in acute food insecurities for the region.

Depleting fish stocks and degrading marine environment in the South China Sea could become a traditional security challenge since depletion of marine resources like fish stocks fuels competition between states and strains inter-state relations. An observation raised during the technical consultation for this report is the potential for warming waters and depleting fish stocks in the South China Sea to exacerbate IUU fishing.[261] While further scientific studies have yet to be conducted on any direct connection between climate change and IUU fishing in Southeast Asia, the lack of joint efforts among coastal states to protect the marine environment and mitigate IUU fishing can add complications to efforts to address maritime disputes, and even instigate tensions between agents of traditional/state security. It is thus imperative to carry out effective protection of the seas, like curbing IUU and promoting sustainable exploitation of marine resources, to prevent the issue from becoming more threatening to human security and regional peace.

IUU fishing has been identified as one of the major causes of fishing crisis in the South China Sea. Its abundant fisheries resources provide jobs to around 3.7 million people, likely an underestimate given the prevalence of IUU fishing in the region. In the Philippines, 10 out of the 13 designated fishing grounds have been overfished. Consequently, the average daily haul of a Filipino fisherman has fallen to 4.76kg from as much as 20kg in the 1970s. In Indonesia, approximately 90% of the roughly 5,400 local and foreign vessels that ply its territorial waters are considered illegal and unregulated.[262]

According to the FAO, IUU fishing generates some USD 6 billion worth of fish catch annually. This adds up to hefty economic losses for several ASEAN countries. Indonesia, the worst-affected, suffers economic losses of USD 3 billion annually, while

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[260] Thomas M. DeCarlo et al., "Mass Coral Mortality under Local Amplification of 2ºC Ocean Warming," *Scientific Reports* 7, no. 44586 (2017), https://doi.org/10.1038/srep44586
[261] Technical consultation, Hanoi, Vietnam, 25 September 2023.
[262] Straits Times, "South China Sea: Fish Wars," *Inquirer.net,* 3 April 2016, http://globalnation.inquirer.net/138297/south-china-sea-fish-wars#ixzz55eNcZFpI

Vietnam records USD 1.6 billion and the Philippines USD 620 million of losses (see Table 5.1).

Table 5.1 Annual economic losses from IUU fishing in Southeast Asia

Country	Illegal, unreported and unregulated (IUU) fishing losses (USD million)
Brunei Darussalam	13
Cambodia	56
Indonesia	3,000
Malaysia	334
Philippines	620
Thailand	500
Vietnam	1,600

Source: Wen Chiat Lee and K. Kuperan Viswanathan, "Framework for Managing Illegal, Unreported and Unregulated Fishing in ASEAN," *Asian Fisheries Science* 33 (2020), https://www.asianfisheriessociety.org/publication/downloadfile.php?id=1290&file=Y0dSbUx6QXdNemcxT0RNd01ERTFPRFUyTWpnd016RXVjR1Jt

Indeed, IUU fishing undermines both short- and long-term economic, environmental and food and nutrition security in Southeast Asia. The region is a leading fish supplier and consumer, at around 25% of the total world fish production. Indonesia, Thailand, Vietnam and the Philippines are the top fish suppliers of the region. In addition, the fisheries sector is a key source of livelihood, jobs and income in Southeast Asia. For example, in Indonesia, the fisheries sector employs around 2.6 million fishers.[263] It is also a food security issue. IUU fishing results in declining fish stocks in a traditional fishing ground or seriously impairs initiatives to rebuild stocks that might have already been depleted from overfishing.[264]

5.2.2 Regional frameworks on IUU fishing

ASEAN member states, in collaboration with the Southeast Asian Fisheries Development Center (SEAFDEC), have developed frameworks, programmes and activities that support the sustainable development of fisheries in the region. The "Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Fisheries Management" developed in the early 2000s. Among the areas addressed are provisions to combat IUU fishing through National Plans of Action on IUU Fishing (NPOAs-IUU).[265]

[263] Wen Chiat Lee and K. Kuperan Viswanathan, "Framework for Managing Illegal, Unreported and Unregulated Fishing in ASEAN," *Asian Fisheries Science* 33 (2020), https://www.asianfisheriessociety.org/publication/downloadfile.php?id=1290&file=Y0dSbUx6QXdNemcxT0RNd01ERTFPRFUyTWpnd016RXVjR1Jt

[264] Malinee Smithrithee et al., "Pushing for the Elimination of IUU Fishing in the Southeast Asian Region," *Fish for the People* (SEAFDEC) 18, no. 3 (2020), http://hdl.handle.net/20.500.12066/6610

[265] Smithrithee et al., "Pushing for the Elimination of IUU Fishing."

Subsequently, the Regional Plan of Action to Promote Responsible Fishing Practices including Combating Illegal, Unreported and Unregulated Fishing in the Region (RPOA-IUU) was established and endorsed by the ASEAN ministers responsible for fisheries in May 2007.[266] The Vision and Strategic Plan for ASEAN Cooperation in Food, Agriculture, and Forestry (2016–2025), the Strategic Plan of Action on ASEAN Cooperation on Fisheries (2016–2020), the 2020 Cooperation Framework on ASEAN Network for Combating Illegal, Unreported, Unregulated (IUU) Fishing, and the Joint ASEAN–SEAFDEC Declaration on Regional Cooperation for Combating Illegal Unreported and Unregulated (IUU) Fishing and Enhancing the Competitiveness of ASEAN Fish and Fishery Products also constitute ASEAN's broader framework for cooperation in combatting IUU fishing and mitigating the overfishing problem.[267]

Despite having several regional guidelines and frameworks on cooperation in ASEAN, IUU fishing remains unabated and fuels inter-state tensions involving Southeast Asian countries and China. The lack of sufficient regulatory control over national fishers and fishing vessels as well as ineffective tools to manage fishing capacity are among the main reasons for IUU fishing in the region. The weak enforcement of fishing legislation, absence of adequate maritime boundary agreements, maritime disputes, and incompatible legal frameworks for combating IUU fishing further exacerbate IUU fishing.

The countries of Southeast Asia have identified IUU fishing by both local and foreign fishers in their EEZs as a major issue.[268] Illegal fishing is also now moving into disputed areas and international waters. These activities have led to fisheries conflicts among coastal states in the region. There are currently no precise figures for the number of IUU fishing vessels the South China Sea as these practices are hard to detect, particularly given the absence of a common desire among the coastal states of the South China Sea to jointly address the issue.[269] In our technical consultations, local maritime experts have suggested that the lack of a common definition of IUU fishing or a shared collaborative framework among the states in the disputed territories of the South China Sea often creates tensions and confrontations between coast guards or maritime law enforcement bodies and fishing vessels.[270]

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[266] RPOA-IUU, "The 13th Coordination Committee Meeting Regional Plan of Action (RPOA) to Promote Responsible Fishing Practices including Combating Illegal, Unreported and Unregulated (IUU) Fishing in the Region," 16 November 2020, https://www.rpoaiuu.org/public/storage/upload/meeting-documents/ccm/13th-CCM-Report.pdf

[267] Smithrithee et al., "Pushing for the Elimination of IUU Fishing."

[268] Lee and Viswanathan, "Framework for Managing Illegal"; Southeast Asian Fisheries Development Center (SEAFDEC), "ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain," 24 August 2015, https://asean.org/wp-content/uploads/2021/09/App-9-ASEAN-Guidelines-IUU-SSOM36th-AMAF-final.pdf

[269] Asmiati Malik, "IUU Fishing as an Evolving Threat to Southeast Asia's Maritime Security," Asian Maritime Transparency Initiative, 16 November 2022, https://amti.csis.org/iuu-fishing-as-an-evolving-threat-to-southeast-asias-maritime-security/

[270] Technical consultation, Hanoi, Vietnam, 25–26 September 2023.

For example, the Scarborough Shoal, a traditional fishing ground of Filipino, Vietnamese and Chinese fishers, has always being in the spotlight when it comes to maritime disputes and overfishing or IUU fishing in the South China Sea. There are regular cases of Vietnamese fishers apprehended by Philippine maritime law enforcement agencies in the Philippines' EEZ; Coast Guard vessels from China aggressively dispersing fishing boats from other claimant states; and Chinese fishing militia vessels being confronted by the Philippine Coast Guard in disputed maritime areas in the South China Sea.

Indonesia has adopted an assertive approach against illegal fishing vessels intruding into its EEZs including a policy of deliberately sinking and destroying foreign vessels.[272] The policy appears to have had a deterrent effect, as there has been an impressive 90% drop in IUU fishing. Additionally, fish stocks in Indonesian waters surged from 7.3 million tons in 2013 to 12.5 million tons in 2017.[273]

Coordinated marine scientific research is still elusive in the South China Sea. There have been past attempts to forge joint marine scientific research between claimant states, such as the Joint Oceanographic and Marine Scientific Research Expedition in the South China Sea (JOMSRE-SCS) between the Philippines and Vietnam that ran from 1994 to 2007. Scientists from Vietnam and the Philippines have proposed reviving the JOMSRE-SCS together with other claimant states including China. In fact, in November 2021, Vietnam and the Philippines agreed in principle to resume the JOMSRE-SCS, but that has not been followed as yet with any concrete bilateral initiative. The geo-political environment remains unfavourable to joint scientific research due to the politicisation of such initiatives. Some states have used marine scientific research to assert their territorial and maritime claims in the South China Sea, hindering it from become a confidence-building and conflict prevention measure.

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[271] Technical consultation, Hanoi, Vietnam, 25–26 September 2023.
[272] Tia Asmara, "Indonesia to Sink More Foreign Boats amid New Maritime Tensions with Vietnam," *Benar News,* 29 April 2019, https://www.benarnews.org/english/news/indonesian/indonesia-fisheries-04292019163426.html; "Stop Joking Around: Fisheries Minister Vows to Continue Blowing Up Illegal Fishing Boats," *Jakarta Globe*, 5 May 2019, https://jakartaglobe.id/context/stop-joking-around-fisheries-minister-vows-to-continue-blowing-up-illegal-fishing-boats; "KKP-Kejaksaan Tenggelamkan 10 Kapal Pencuri Ikan di Natuna Utara [The Ministry of Marine Affairs and Fisheries in collaboration with the Public Prosecution Office of Indonesia sank 10 illegal fishing vessels in Natuna Utara]," *Antara News*, 31 March 2021, https://www.antaranews.com/berita/2074558/kkp-kejaksaan-tenggelamkan-10-kapal-pencuri-ikan-di-natuna-utara; "Fishing Quota Policy Aims to Prevent IUU Fishing: Minister,"
Antara News, 8 May 2023, https://en.antaranews.com/news/280863/fishing-quota-policy-aims-to-prevent-iuu-fishing-minister
[273] Basten Gokkon, "Indonesia's ex-Fisheries Minister Susi Pudjiastuti Leaves Big Shoes to Fill," *Mongabay,* 24 October 2019, https://news.mongabay.com/2019/10/indonesias-ex-fisheries-minister-susi-pudjiastuti-leaves-big-shoes-to-fill/

6. Key Findings on Climate Change, Peace and Security Risks

Climate change can exacerbate the intensity and frequency of multifaceted peace and security issues in Southeast Asia. While it is not proven that climate change-induced events will directly lead to conflict and violence, climate change and conflict, separately and together, impact livelihoods, imperil adaptation, and weaken social cohesion. The compounding impact of climate change – interacting with various intractable peace and security challenges in the region – on vulnerable sectors and peoples could generate new security challenges to the well-being of states and communities, but also foster greater cooperation. This report highlights the following key findings:

i. Economic security

ASEAN is a multifaceted region composed of both lower- and higher-income member states. Some member states may be disproportionately vulnerable to climate change impacts on internationally important trade and transport sectors, especially in the case of lower-income countries which have limited financing to adapt their infrastructure to the changing climate. The failure to address persistent poverty and unequal development in the region, and to address the diverse needs of displaced populations, can place undue strains on regional peace and stability.

The impacts of climate change on economic security are broad and likely to vary depending on the locations and types of industries. Changes in temperature and precipitation can have negative impacts on GDP growth, including through impacts on labour and productivity in the agriculture, manufacturing and services sectors, as well as through the improvement of human capital. Such diverse impacts within the region encompass sectors such as water management, agriculture and food security, tourism, health, natural resource management, human settlement and security, amounting to as much as USD 18–19 billion heading up to 2050. However, there are glaring gaps in generating harmonised and comparable downscaled data on the impacts of climate change across economic sectors. In particular, one gap is that available data reflect country-specific impacts of specific climate threats, with insufficient disaggregation accounting for impacts by economic sector. A second gap is that sector-specific analysis is likewise limited to the global and regional level, with limited disaggregation or "downscaling" at the national and sub-national levels.

ii. Food security

Southeast Asia is considered the world's "rice bowl" given that more than 80% of the global rice trade is sourced from the region. Yet, owing to climate change, the yields or productivity of agriculture are expected to decline by 10% by 2050. Climate-induced disasters could further punctuate food insecurity challenges from climate-induced

impacts on food production, food prices, and disruptions to food trade and distribution. Due to the impact of climate change on productivity, Southeast Asia has already seen a “U-turn” in undernourishment levels, whereby undernourishment across the 10 ASEAN member states started increasing in 2014–2016, reversing from falling trends in undernourishment from 2000–2014. At the broader level, climate change can also have further distributional concerns for multiple actors across the supply chain, from food production (including crops, livestock, fisheries and aquaculture), to transport, storage and food consumption, owing to climate factors such as temperatures, humidity, precipitation and extreme weather events.

iii. Health security

When faced with the effects of climate change, the vulnerabilities of healthcare systems in Southeast Asia could be compounded. In developing countries grappling with weak health systems, lack of medical personnel and issues surrounding cost of and access to medical care and healthcare, climate change effects, such as rising global temperatures, vector-borne diseases and zoonotic transmissions, would have a detrimental impact on their health security (see section 3.3). Some countries in Southeast Asia also have disparities in access to quality health services, when access to quality health services would be extremely needed by climate change-affected sectors. Vulnerable groups such as conflict-prone communities, women, ethnic minorities, the elderly and migrant workers may face inadequate access to social and health services and social security infrastructure even as they bear the brunt of the impact of climate change.

iv. Water security

Hydropower dam projects in the Mekong River have generated concerns and potential tensions between upstream and downstream states. Several studies have highlighted the adverse effects of dam projects, particularly in downstream countries, such as fish stock depletion, negative changes in river hydrology, and sediment flux (see section 3.4). The case of the Mekong River highlights contending interests from water security, energy security and food security stakeholders. The unintended impact of hydropower dams, exacerbated by climate change, on the health of the Mekong River has severely affected the economic security of farmers and fisherfolk that have traditionally relied on the river. Furthermore, dam projects have also led to forced displacement of ethnic minorities.

The growing intensity and variability of climate change-induced weather events should be a concern for Southeast Asia because it further exposes populations at-risk, even those not previously affected, to water security issues. Recent studies warn that up to 96% of the ASEAN region is likely to be affected by drought, and up to 64% will face extreme drought. This will bring about complex challenges with regard to access to

clean water for agriculture and domestic consumption. Nonetheless, there is no evidence yet that water insecurity issues in the region are generating societal and transboundary armed conflicts over dwindling freshwater resources.

v. Natural resources

Southeast Asia is projected to become a vital node in the global supply chain supporting the green energy transition. Southeast Asia has some of the critical mineral deposits in Southeast Asia necessary in making the components for solar panels, batteries for electric vehicles, and wind turbines. This has significant ramifications for the region, both in terms of its sustainable development trajectory and related challenges to peace and security. Increased mining would have local impacts, including on communities (see section 3.5). With the procurement of critical minerals now a key obstacle to achieving decarbonisation and international security, increased geo-political competition for the resources could also be expected. These developments have become a critical element of how countries in Southeast Asia experience climate impacts on regional peace and security.

vi. Disasters

Concurrent and sequential disasters are stretching the national capacity to respond effectively, and underinvestment in sustainable development and infrastructure adaptation remains a key challenge to regional peace and security (see section 3.6). Sea-level rise will have a more sustained and gradual impact but is no less critical as it would affect more people. Both climate impacts – disasters and sea-level rise – require sustained commitment to protect human security over the longer term. To this end, the ASEAN Agreement on Disaster Management and Emergency Response has highlighted the importance of regional cooperation as a starting point toward a more resilient region. Also key would be to recognise that the impact of extreme weather events would be more severe for vulnerable groups and communities.

vii. Gender

Policies to improve gender equality and increase women's capacity and resilience to climate change are present at the formal levels, enshrined in legislation or through the ratification of relevant documents. However, their impact has been limited by patriarchal norms and traditional gender roles (for example, women taking on a higher share of care responsibilities and having lower access to information). There is a therefore a need to ensure the inclusion of women in decision-making processes through representation and leadership, which would further ensure that climate policies are gender-responsive from the ground level up. By taking into consideration the specific needs and knowledge of women (such as flexible schedules and childcare) and working with them to develop inclusive programmes that are tailored to build

their climate resilience, policies that promote women's participation in climate initiatives can effectively work to empower them.(see section 3.7).

viii. Forced migration

Climate change could trigger forced migration, directly, through extreme weather events, or indirectly, in the form of deteriorating living conditions and livelihoods as sea levels rise. Those forced to move as their homes become uninhabitable or their livelihoods unsustainable would be vulnerable to risks such as human trafficking, with women and girls in post-disaster situations in particular being at risk (see section 3.8). Nevertheless, it is important to recognise that the link between climate change and mobility is complex: climate change should not be seen as the only factor, but as one thread within the broader political, social and economic canvas.

ix. Internal conflicts

Climate change exacerbates pre-existing tensions, both directly, in extreme weather overlaying internal conflicts, and indirectly, with the increasing interest in exploiting resources, primarily hydropower. Extreme weather events have imposed additional burdens on conflict-prone communities whose adaptive capacity have long been compromised. Thousands have been temporarily displaced due to extreme weather events particularly in areas with pre-existing tensions in Southeast Asia. Nonetheless, internal conflicts and climate change appear to have no direct relationship. Existing internal conflicts in the region are not caused by climate change. However, the converging impacts of climate change and internal armed conflicts can critically undermine the human security of IDPs and vulnerable communities. These impacts may manifest as threats to their food security, economic security, health security, sustainable development, environmental rights and human rights. There are also conflicts over or local opposition to the construction of massive hydropower dams, particularly in traditional lands and river plains where ethnic minorities dwell. These cases could generate or aggravate ongoing internal conflicts. The compounding impacts of multiple climate-induced weather events and internal conflicts could jeopardise the capacity of relevant government agencies to respond.

x. Geo-political dynamics in the Mekong Sub-region

In the Mekong Sub-region, there have been diverging interests in building hydropower dams and transboundary water management between upstream and downstream countries. However, the tensions and differences have not resulted in armed conflicts over the Mekong River. It is important to analyse how existing frameworks such as the Mekong River Commission can help foster cooperation in addressing climate

change impacts in the Mekong Sub-region, including potential peace and security linkages.

xi. Geo-political dynamics in the South China Sea

Rising ocean temperatures means warmer waters in the South China Sea, driving fish to abandon their historic territories and migrate to temperate and cooler waters. Depleting fish stocks, worsening IUU fishing, and a degrading marine environment can add another layer to the traditional security threats in the South China Sea, in that depletion of marine resources like fish stocks worsens maritime disputes between claimant states and strains inter-state relations. The warming waters and depleting fish stocks in the South China Sea might also exacerbate IUU fishing.

7. Pathways for Enhanced Cooperation on Climate Change, Peace and Security: Recommendations

With climate change now an indisputable key component of the peace and security calculus in Southeast Asia, it is necessary to integrate its impacts and effects into future planning to create opportunities for intervention by all stakeholders.

Outlined below are a proposed set of recommendations to foster a region-wide understanding of the climate, peace and security nexus and create collaborative opportunities. These are policy entry points for ASEAN across its socio-cultural, economic and political-security pillars, as well as national governments, civil society, and relevant international institutions, to promote deeper cooperation in addressing emerging challenges to peace and security brought about, directly and indirectly, by climate change.

i. Adopt policy frameworks and strategies that simultaneously address climate change and pursue conflict prevention and resolution.

Countries facing protracted internal conflicts can consider national action plans and strategies that aim to increase climate resilience among conflict-prone communities and vulnerable groups. State agencies, in collaboration with humanitarian and development organisations, should integrate climate change and peacebuilding objectives into local climate action and resilience-building in a conflict-affected context. Acknowledging the complex interplay between climate change stressors and inherent insecurity at the community level is a crucial step toward adopting comprehensive strategies for promoting social stability and cohesion, rule of law and climate resilience in conflict-afflicted communities. Integrated strategies address climate change adaptation and underlying drivers of conflicts as well as offer a pathway to effectively mitigate overlapping climate and conflict vulnerabilities. Policies should institutionalise inclusive and conflict-sensitive decision-making mechanisms to broaden the involvement of vulnerable groups, especially poor farmers and fisherfolk, peoples, IDPs, women and youth.

ii. Develop downscaled assessments of climate impacts on economic sectors to help prioritise a long-term climate change adaptation agenda and to strengthen ASEAN economic and trade-related infrastructure

ASEAN member states may be disproportionately vulnerable to climate change impacts in internationally important trade and transport sectors, especially in the case of lower-income countries. It is therefore critically important to have unhampered supply flows of goods and services, as this could have an impact on labour and human capital development, incomes as well as consumption. However, there are gaps in data on downscaled climate change impacts across economic sectors. A much-needed future area of research in Southeast Asia will be to address this challenge at

the country level and across sectors within countries. This can serve as a starting point for prioritising key economic areas which are vulnerable to climate-induced economic displacement. This analysis can build on existing initiatives of the ASEAN Working Group on Climate Change (AWGCC) alongside the studies by the Intergovernmental Panel on Climate Change (IPCC), potentially feeding into future editions of the *ASEAN State of Climate Change Report*. These can in turn feed into the development of common standards for climate adaptation of strategic ports, supply chain hubs, and trade infrastructure in vulnerable countries. This can be further complemented with international/multilateral investments to implement such standards for climate adaptation to avoid climate-induced supply chain disruptions.

iii. Hasten the implementation of guidelines for digitalisation in food supply chains

Digital technologies offer potential solutions to climate change impacts on agriculture, including early warning systems as well as tailored farmer advisory services for adapting planting schedules and practices to the changing climate. While the ASEAN Guidelines on Promoting the Utilization of Digital Technologies for ASEAN Food and Agricultural Sector has been developed and endorsed at the 43rd Meeting of the ASEAN Ministers on Agriculture and Forestry in 2021, further collaboration is required in hastening the implementation of the guidelines. As food security is a critical component of regional peace and security, agriculture presents a potential low-hanging fruit or a strategic area where the biggest impacts can be achieved from using digital technologies for climate change adaptation. As a starting point, regular meetings can be done to take stock of progress in the implementation of the guidelines.

iv. Harness the role and mandate of ASEAN institutions on peace and security

ASEAN has established important institutions that can help the region reimagine a regional approach to conflict prevention and peacebuilding. They include the ASEAN Institute for Peace and Reconciliation (AIPR), ASEAN Commission on the Promotion and Protection of the Rights of Women and Children, ASEAN Intergovernmental Commission on Human Rights (AICHR) and the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre), among others. These regional mechanisms and institutions can significantly help facilitate, drive and lead multilateral initiatives aimed at addressing intractable conflicts and societal tensions in the region. ASEAN leaders can consider boosting the mandate and capacity of these institutions to mainstream climate change, peace and security assessments to identify potential security risks emanating from climate-induced crises and challenges.

v. Mainstream participation, mediation and arbitration in resource management and conflict prevention

Mediation and arbitration have been important, efficient and cost-effective means of resolving disputes in Southeast Asia, in different settings and socio-economic contexts. Community-based mediation and arbitration mechanisms help prevent and mitigate societal tensions and conflicts. Managing the competing interests and needs of various communities and groups, in the context of peacebuilding, climate change impacts and the consequences of climate change adaptation and mitigation efforts, can be effectively done with strong partnerships with and the participation of grassroots leaders, local officials and community leaders. For instance, in the context of the management of marine resources and transboundary water affected by climate change, it is critical that resource sharing and co-management must be driven by the stakeholders themselves (farmers, fisherfolk, coastal communities, indigenous peoples, etc.) who can commit personal investment, ownership and buy-in to the process, resulting in more effective governance. An important requirement is for stakeholders in the region to demonstrate strong commitment to work together while respecting sovereignty and ethnocultural differences. Stakeholder participation can also lead to institutionalising better management systems and fair sharing of resources.

vi. Establish a regional platform for scientific collaboration in Southeast Asia

A regional platform for climate scientists, marine scientists, agricultural scientists, social scientists, and resource management experts can help ASEAN find and adopt science- and evidence-based regional frameworks and action plans and establish coordinated early warning systems and preparedness mechanisms. They can jointly explore or conduct knowledge sharing on smart water-resource and ocean resource management systems, and innovative practices and technologies, and develop new crop varieties that are more resilient to drought, salinity and flooding. Interdisciplinary scientific and social research facilitates more effective climate action and mitigation of potential drivers of conflicts in the region.

vii. Leverage regional mechanisms to strengthen climate change adaptation

Putting the AHA Centre, working in collaboration with the ASEAN Centre for Biodiversity and the ASEAN Specialised Meteorological Centre, at the forefront of ASEAN's climate change adaptation would be strategic. The expansion of its disaster response mandate to engage intersecting risks (e.g., conflicts, pandemics, impacts of climate change, etc.) should be considered. This would also enhance ASEAN's commitment to addressing the climate emergency, through recognising the multidimensional nature of climate change and the interconnectedness of its collateral and subsequent disasters.

viii. Strengthen the capacity of sub-national entities and empower community leadership for disaster risk reduction in Southeast Asia

Over the past two decades, ASEAN member states have invested in and developed a disaster governance framework. It is now time to implement this vision outside of capital cities and central governments to meet the needs of populations exposed to rising sea levels and intensifying disasters. Through inter-sectoral partnerships developed at the regional level, ASEAN entities are well-positioned to share insights and expertise to strengthen capacity at the sub-national levels in line with regional and global commitments to achieve a resilient ASEAN region.

ix. Identify and build cross-sectoral synergies on critical minerals through regional cooperation to enhance climate change resilience in ASEAN

Interest in Southeast Asia's critical minerals has grown as the world ramps up efforts toward the green energy transition. There is therefore a need for ASEAN to identify a common definition of critical minerals to promote responsible resource management. This regional effort can then draw on the diversity of its membership to provide a comprehensive approach to its role as a key critical mineral source and production hub that is part of the global supply chain for the green energy transition. This will require greater strategic vision and stronger governance mechanisms on critical minerals that ensure no one is left behind or negatively impacted by the global green energy transition. This targeted effort will constitute a preventive measure to offset the potential for societal disruption and inter-state tensions within the region.

x. Strengthen gender-mainstreaming at all levels of policy development through the women, peace and security framework

ASEAN has already acknowledged the specific gendered nature of the impacts of crises on women through the ASEAN Joint Statement on the Women, Peace and Security (WPS) Agenda as well as the importance of the role of women in regional peace and security through the ASEAN Ministerial Dialogue on Strengthening Women's Role for Sustainable Peace and Security in 2020. This recognition should be furthered by integrating the WPS agenda across the whole of ASEAN as per its three community pillars: Political-Security Community, Economic Community and Socio-Cultural Community.[274] With the WPS Regional Plan of Action, there is an opportunity to expand and use this framework to integrate a gender perspective when examining the linkages between climate, peace and security in the region. This will further enable policymakers to gain a holistic understanding of the socio-economic

[274] Tamara Nair and S. Nanthini, "COVID-19 and the Impacts on Women," NTS Insight IN20-05, July 2020, https://www.rsis.edu.sg/wp-content/uploads/2020/07/NTS-Insight_COVID-19-and-the-Impacts-on-Women-30July2020.pdf; Tamara Nair, "Climate Security and the Role of Women in ASEAN," RSIS Commentary, 4 April 2023, https://www.rsis.edu.sg/rsis-publication/nts/climate-security-and-role-of-women-in-asean/

and political-security challenges facing the region, including the distribution of opportunities and resources, in the face of a rapidly intensifying climate riskscape.

xi. Institutionalise a comprehensive protection framework for displaced populations

Building on proposals from international humanitarian institutions, ASEAN can adopt and institutionalise a regional humanitarian and protection framework covering vulnerable peoples forcibly displaced by climate change-induced disasters, conflicts, and other humanitarian crises. Within such a protection framework, ASEAN can establish a system in the region to monitor emerging tensions, fragilities and protection needs, contributing to the identification of sustainable solutions. A regional protection agenda for displaced people that respects the principle of non-refoulement, protects human rights and serves the shared interests of countries in the region could be one collective response of ASEAN to emerging climate, peace and security challenges.

xii. Promote closer ASEAN–UN cooperation on advancing climate, peace and security agenda

Given the complex nature of the linkages between climate change, peace and security in Southeast Asia, ASEAN and the UN can consider joint initiatives that will integrate climate change considerations into prevention, mediation and peacebuilding strategies at the regional and national levels. Relevant ASEAN bodies can explore modalities of cooperation with the UN Department of Political and Peacebuilding Affairs' Climate Security Mechanism. ASEAN and the UN can jointly collaborate through regular exchanges and capacity-building workshops by bringing together officials, civil society, and the research community in the region. This would further build and strengthen existing regional capacities, support local solutions, and expand knowledge on climate-related security risks in Southeast Asia. Following the 2023 *A New Agenda for Peace* by the UN,[275] ASEAN and the UN can explore the potential for establishing a joint regional hub on climate, peace and security that will connect national and regional experiences, provide technical advice to Member States and help accelerate progress, including on how to bridge climate action and peacebuilding.

[275] United Nations (UN), "Our Common Agenda Policy Brief 9: A New Agenda for Peace" (New York: UN, July 2023).

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