CLIMATE CHANGE, SECURITY, AND POLITICAL COHERENCE IN THE SOUTH AND EAST CHINA SEAS:
A SCENARIOS-BASED ASSESSMENT

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<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>INTRODUCTION AND SUMMARY</td>
</tr>
<tr>
<td>5</td>
<td>SCENARIOS FOR THE SOUTH AND EAST CHINA SEA REGION</td>
</tr>
<tr>
<td>8</td>
<td>SCENARIO 1: TOGETHER WE STAND – LOW POLITICAL FRAGMENTATION AND LOW FOOD PRICES</td>
</tr>
<tr>
<td>10</td>
<td>SCENARIO 2: SOCIAL ENTROPY – HIGH POLITICAL FRAGMENTATION AND LOW FOOD PRICES</td>
</tr>
<tr>
<td>12</td>
<td>SCENARIO 3: DIVIDED WE FALL – HIGH FOOD PRICES AND HIGH POLITICAL FRAGMENTATION</td>
</tr>
<tr>
<td>14</td>
<td>SCENARIO 4: HUNGRY AND HUNKERED DOWN: HIGH FOOD PRICES AND LOW POLITICAL FRAGMENTATION</td>
</tr>
<tr>
<td>16</td>
<td>CONCLUSION AND KEY OPPORTUNITIES FOR DEFENSE, DIPLOMACY AND DEVELOPMENT LEADERS</td>
</tr>
<tr>
<td>18</td>
<td>ANNEX 1: CLIMATE SNAPSHOT: SOUTH AND EAST CHINA SEAS</td>
</tr>
<tr>
<td>20</td>
<td>ANNEX 2: PARTICIPANTS, CLIMATE SECURITY IN THE SOUTH &amp; EAST CHINA SEAS - EXPERTS GROUP</td>
</tr>
</tbody>
</table>
INTRODUCTION AND SUMMARY

Climate change is a present and growing threat to countries bordering the South and East China Seas. It tests governments already weakened by the strains of the global pandemic in fundamental areas such as governance, food provision, and social and economic development. How these governments respond to the intersectional and security implications of climate change could well determine the course of regional development for decades to come.

This paper projects four “climate security scenarios” for the region to tease out key issues and inform future decision-making:

1. **TOGETHER WE STAND**: low political fragmentation and low food prices allow for social collaboration and international cooperation on resilience;

2. **SOCIAL ENTROPY**: high political fragmentation and low food prices induce social discontent, exacerbated when responses to a climate-induced disaster appear to favor the politically connected;

3. **DIVIDED WE FALL**: high political fragmentation and high food prices wreck havoc on developing Asian countries, which are practically paralyzed when drought and flood events hit their key food production areas; and

4. **HUNGRY AND HUNKERED DOWN**: low political fragmentation and high food prices induce economic collaboration in the face of climate-induced food price shocks, tempering potential food price wars, but the region falls short on security policy coherence in the face of a growing Chinese maritime presence.

Anticipating and preventing destabilizing outcomes will require unprecedented collaboration among policymakers and actors at the confluence of defense, development and diplomacy. The politically aware and digitally connected populations of East and Southeast Asia may not tolerate failures of governance as in the past – especially as climate change complicates governments’ tasks of delivering food security and physical security. Investments to upgrade and increase the resilience of critical food, energy, waste, transport and other essential infrastructure are urgently needed. The “soft infrastructure” of inclusive political discourse and responsive policy-making requires upgrades as well, especially in states with a disconnect between a powerful elite and the broader population. In the realm of diplomacy and defense, holistic planning based on data-driven analytical tools and a clear-eyed assessment of the strength and flexibility of regional political organizations will help identify new avenues for multi-sector collaboration that can be systematized to meet the growing security risks of living in a climate-changed world.
The Asia Pacific is home to more people and infrastructure at risk from climate change than any other region in the world. Yet the implications of climate change for national and regional security remains a “topic without a strategy in regional military discourse.”¹ Regional governments widely acknowledge the benefits of investing in clean energy: well-paying jobs, rising living standards, cleaner air, water and soil, and other factors which contribute to a peaceful, prosperous society. Less appreciated in regional policy circles are the negative security consequences of continued reliance on coal and natural gas.² While Southeast Asian countries trimmed future coal pipelines by more than 60% from 2015-2021,³ a recent analysis⁴ reveals that the combination of existing coal plants and the remaining pipeline – particularly in Indonesia, Vietnam, and the Philippines - will make achieving climate goals exceedingly difficult. The consequence will be continued natural disasters, further breakdown of ecosystem services caused by heavy fossil fuel use in growing economies, and growing competition over depleted soil, water, and fish stocks – all potential sources of fragility and instability in a highly-populated, politically charged region.

The South and East China Sea regions provide rich fodder for scenario analysis. The confluence of developing countries in Southeast Asia, more mature economies in East Asia, disputed marine territories and a newly reinvigorated Chinese presence (which blurs military, economic, and development assistance interests) has fanned the proverbial fire of political turmoil. Adding the destructive forces of storms, sea level rise, ocean acidification and concomitant degradation of vital air, soil and land, sharpens the risk profile. Climatic risk is increasingly modellable, and predictive tools for assessing the behavior of human social systems are also improving. Thus it is critical to examine the two factors concurrently, in the context in which they will be experienced.

The positioning of Association of Southeast Asian Nations (ASEAN) sea lanes makes them a theater for larger geopolitical disputes. An estimated $5.3 trillion of goods sail ASEAN waters each year. The Strait of Malacca, between Malaysia and Indonesia, is the busiest strait in the world, witnessing the passage of 15 million barrels of oil per day.⁵ Interruption of trade flows here could disrupt industries and economies all over the world. The main concern is not extreme weather causing impassable seas, but rather the combination of construction of military outposts on small islands and marine features,⁶ heightened international tensions and rising water intensifying conflicting claims to already disputed territories.

¹ Alistair D.B. Cook, Coordinator of Humanitarian Assistance and Disaster Relief [HADR] Programme Senior Fellow, NTS Centre, S. Rajaratnam School of International Studies, Nanyang Technological University, email exchange with authors, January 27, 2022.
A NOTE ON THE METHOD: USING SCENARIOS TO INFORM ANALYSIS AND POLICY

The climate crisis is unlike any other that humanity has known. Like a global pandemic, it is a systemic threat affecting people and organizations around the world. Unlike a pandemic, however, it is not the result of an organism that can be isolated and treated or eradicated. Halting climate change will require levels of investment and systems change unprecedented in their scale, scope and urgency.

Scenario analysis is a useful methodology for assessing systemic threats across time and geography. Such analysis provides a toolbox to anticipate and prepare for future developments and to prevent unwanted consequences. Scenarios consist of a set of assumptions for the future, grounded in science and social science, designed to illuminate hidden risks and opportunities and provide a basis for insightful planning. Thoughtfully applied, they can help leaders prepare their organizations and stakeholders for a future marked by dispersed, non-linear systemic threats. Our methodology for constructing these scenarios involved:

- Developing a snapshot of expected physical climate change impacts over the next 5 years;
- Convening a diverse group of regional experts to discuss the likely implications of these impacts on the issues they cover. Specifically, the group was asked:

  Given the snapshot of expected physical climate change effects, what are the key socio-political, technological, demographic, diplomatic, military and economic drivers that will shape the climate security risk landscape in the region during the next 5 years? What are the most important and most uncertain drivers?

Based on this expert input, we identified two of the most important and uncertain drivers of climate security risks in the region. We then developed four climate security scenarios incorporating these drivers. We do not make a judgment as to which scenario is most likely, nor are the scenarios mutually exclusive.

NEAR-TERM REGIONAL CLIMATE TRENDS AND IMPLICATIONS

More frequent periods of prolonged heat, provoking:
- An attendant rise in high heat stress days affecting unprotected populations
- An increased need for energy for cooling
- Billions of costs in productivity loss and health care costs

An increase in mean precipitation, causing:
- Growing incidents of flood damage in river basins
- Higher stress on transport and urban infrastructure

Sea-Level rise, inducing:
- Coastal flooding, already in progress because of land subsidence, over-use of land-based water resources, human-induced fluvial sediment flux and erosion
- Threats to coastal mega-cities and some of the region’s prime agricultural areas

High-intensity storms, with the potential to disrupt:
- Fishing, shipping and other marine activities
- Land-based lives and livelihoods

Quickening ocean carbon absorption, leading to:
- More rapid global warming
- Acidification of ocean waters, affecting sea life and impacting marine fisheries

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7 See Annex 1.
8 For a list of experts, see annex 2.
9 Derived from the “Climate Snapshot, South and East China Seas,” Annex 1.
DRIVERS: REGIONAL POLITICAL COHESION; FOOD PRICES

Our exercise identified two of the most important and uncertain factors shaping the climate security landscape in the South and East China Sea as:

- **Regional political cohesion** among the 10 countries of the Association of Southeast Asian Nations, or ASEAN, which share a common geography and some socio-political development interests but are at diverse levels of economic development and domestic social cohesion, the developed countries of East Asia, and China as the regional hegemon—made more complex by the geopolitical tension between the U.S. and China; and

- **Food prices** as a proxy for societal well-being, especially in a region where smallholder agriculture is both a major source of livelihood (about 39 percent, according to World Bank figures for seven developing Southeast Asia economies)\(^{10}\) and the main source of nutrition for domestic populations.

Based on these two drivers, we constructed four scenarios titled:

1. Together We Stand
2. Social Entropy
3. Divided We Fall
4. Hungry and Hunkered Down

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SCENARIO 1: TOGETHER WE STAND – LOW POLITICAL FRAGMENTATION AND LOW FOOD PRICES

SUMMARY: As the region emerges slowly but steadily from the COVID-19 induced economic downturn, U.S. and European foreign direct investment (FDI) returns to pre-pandemic levels. Dissatisfaction with national governments’ handling of health issues recedes as economic opportunity grows. Nascent climate resilience infrastructure is put to the test as a series of storms upset coastal communities in Indonesia. Concurrent Chinese and U.S. relief efforts become a study in contrast, and public opinion surges in favor of the West. Recognizing the need for collective strength in a situation of vulnerability, ASEAN tables a new proposed article to its charter on collective defense of territorial waters, which is widely seen as a shot across China’s proverbial bow in the South China Sea. This strengthens regional states’ ability to walk the political and economic tightrope between the U.S. and China.

- Regional economies re-ignite, with aid from renewed foreign investment in advanced manufacturing facilities and the advent of new trade agreements.
- Development aid resumes, with a focus on preparing vulnerable populations for growing climate risk.
- A Chinese disaster relief effort, launched from a newly-militarized island in disputed marine territory and directed partially to rescuing Chinese contractors, contrasts sharply with U.S. naval relief efforts that target local populations and include delivery of desperately needed medical supplies.
- Advancements in domestic agriculture and manufacturing give ASEAN nations the confidence to invest in the shared-sovereign governance structures of mutual defense.
- U.S. and European militaries carry out disaster response and preparedness, and maritime surveillance exercises with select ASEAN Member States, frustrating China.

DETAILS: With global economic recovery, the resumption of FDI, and a boost from the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) trade agreement, the South and East Asian economies resume their pre-pandemic growth levels. Household incomes rise, students return to school, and both retail and manufacturing businesses pick up pace, albeit with new health safeguards. Violent extremist groups demonstrate lower levels of activity and recruitment. Development activities proceed apace, with a climate resilience theme. The U.S., the E.U., Japan, Korea and China seem to be vying for political and diplomatic points with aid to vulnerable coastal megacities and arid agricultural regions.

Efforts to modernize rural agriculture with technology and cloud-based tools resume, making it more resilient to climate shocks. This in turn lowers the risk of impoverished farm families abandoning their land for the cities, or succumbing to violent extremist group recruitment overtures. Following a 2019 study finding that Vietnam’s critical Mekong Delta rice-growing area is two meters lower than previously believed, the Asian Development Bank funds a massive seawall to protect some of the fast-flooding rice plains while Japan supplies transition funds for rice farmers to cultivate seaweed, fish and other non-rice consumables. Elsewhere in the region, investment trends shift from fossil fuel-fired to renewable energy power plants, and from traditional manufacturing to a mix of traditional and 3D manufacturing.

A series of severe storms hit the Indonesian provinces of Borneo, Java, and Sumatra in 2027. Under the guise of assistance, the Chinese dispatch vessels stationed in disputed fishing and oil exploration areas. While official pronouncements proclaim aid to local port communities, observers on the ground report the first assistance going to onsite Chinese contractors. Meanwhile, the U.S. Navy, in the area including for its increasingly regular Freedom of Navigation Operations, responds successfully to a Malaysian cruise ship capsized by the storms while the U.S. Naval Ship Mercy docks off Sumatra, delivering desperately needed medical supplies and skilled medical personnel. News media in the region declare “US 2, China 0” in providing humanitarian assistance. In the wake of the ensuing social media storm Malaysia and Indonesia propose a new article for the ASEAN Charter, stating that a foreign state’s attempts to extract marine resources from the Exclusive Economic Zones of an ASEAN Member State would be treated as an attack against ASEAN collectively. It would require all able Member States to come to the defense of their respective ally. The U.S. and E.U. openly endorse this development. China objects that it is targeted at Beijing. As China readies gunboat-accompanied fishing vessels to test ASEAN’s resolve, Japan steps in to mediate.

**KEY INDICATORS:**

- ASEAN states resume pre-pandemic economic growth; social unrest settles
- Relative political calm provides an opportunity to deepen and institutionalize ASEAN’s resolve to mutually defend disputed marine territories
- External states – the U.S., the E.U. and China, as well as Japan and the Republic of Korea – vie for influence via economic investment and development aid, both with a climate-readiness bent
SCENARIO 2: SOCIAL ENTROPY – HIGH POLITICAL FRAGMENTATION AND LOW FOOD PRICES

SUMMARY: The region emerges slowly from the COVID-induced economic downturn as Western FDI resumes, albeit at lower levels than previously. Foreign investment from both the West and East Asian (Japan, Republic of Korea) nations is concentrated on expected “winners,” to the chagrin of some. Low food prices combined with a growing GINI coefficient spur dissatisfaction amongst students and others who feel excluded from societal advancement. This sentiment is amplified when climate-induced disasters predictably strike: militaries and first responders are accused of rescuing and restoring essential services to powerful and privileged groups first.

- National youth movements protesting social and environmental inequality emerge, and start to share tactics across borders.
- Governments focused on domestic economic development fail to coordinate messages or strategies.
- Humanitarian Assistance / Disaster Response (HA/DR) missions become politicized, despite efforts of disaster response organizations to maintain distance from political discourse.
- External power attempts to divide and conquer to gain access and allies in a fractionalized region.

DETAILS: The global and regional economies come back online, with unemployment dropping and stable food prices allowing households to move toward a new degree of normalcy. However, the benefits do not accrue equitably across Southeast Asia. Foreign investment favors Malaysia, Indonesia and Vietnam, and largely excludes Brunei, Burma, Laos, and Cambodia. Dictatorial governments in the Philippines and Thailand try to play the U.S. and China off each other for investment and geopolitical gain. A similar dynamic exists, though to a lesser extent, with regard to Japan and South Korea.

Low food prices but inequitable development policies spark local youth protest movements across developing ASEAN. The youth-led movement is reminiscent of – and reputedly sprung from – the “Milk Tea Alliance” that arose spontaneously against Chinese strictures against democracy, human rights, and Taiwanese sovereignty in 2020. Inevitably, national movements become linked. The Chinese government decries American influence; the protestors respond by marching with American flags (much to the chagrin of American officials). East and Southeast Asian nations with active groups find themselves in an uncomfortable position. Each faces criticism for not offering sufficient youth employment options, for not standing up to Chinese human rights violations, or both.

A series of severe weather events strike the region in April-May 2026. Within the span of 6 weeks, millions of people are displaced in Bangkok, Ho Chi Minh City, Manila, Taipei and Shanghai. In Taiwan, military responders are slow to take charge and share the blame, in the public eye, for many of the 55 deaths. The Chinese government uses the incident to showcase its own prowess, boasting that no one died in Shanghai (although some rogue Weibo accounts state otherwise). In the Philippines and Thailand, military rescue units were deployed first to prosperous areas of the city, spurring accusations of elitism. Several neighborhood protests in Manila are put down forcibly, with no clear accounting of casualties. ASEAN is fractured and thus silent. Chinese media depict the situation as evidencing the need for a strong regional stabilizing force, and the country redoubles its maritime presence and militarization of islands in the South China Sea. The U.S. steps up Freedom of Navigation Operations while Japan quietly offers bilateral assistance in disaster preparedness and response to affected nations.
KEY INDICATORS:

- Domestic social unrest spreads response to economic and environmental inequalities; multiple movements become one
- Accusations of preferential treatment in HA/DR missions adds fuel to the unrest and complicates regional political discourse
- The U.S. and China both interpret the developments as signs of political instability, while Japan responds tactically to the need for improved disaster response
SCENARIO 3: DIVIDED WE FALL – HIGH FOOD PRICES AND HIGH POLITICAL FRAGMENTATION

SUMMARY: Ongoing waves of COVID variants and sharpened trade disputes set off deglobalization trends across multiple industries. Trade and investment activity between regional players and the West plummet. Concurrently, a wave of droughts in agricultural areas and salinization of low-lying rice fields cuts sharply into regional food production, with attendant price hikes. Vast swaths of poor families are plunged into economic despondence. Neither ASEAN nor other regional governance structures are able to respond in a timely fashion. China pursues aggressive policing of, and exploitation of, resource-rich areas of the South China Sea.

- Extreme weather and reduced trade volumes wreak havoc on the prices of food and other essential commodities.
- Governments in developing ASEAN countries are unable to meet the needs of hungry, economically disparate populations.
- While the World Bank, the Asian Development Bank, and Japan organize assistance packages, regional governance structures are reduced to bickering, rendering coordination difficult.
- Sensing a fraying of regional stability, China steps up its airborne and seaborne patrols of the South and East China Seas. It also occupies the most mineral- and fish-rich portions of the South China Sea, exploiting both for its own use and barring others from entering.

DETAILS: With global trade and politics devolving into U.S. / E.U.-led and Chinese-led blocs, trade and tariff levels rise, and deglobalization sets in. Supply chains shrink as national governments offer incentives for re-homing production. The developing countries of Southeast Asia see their GINI coefficients rise and lose hard-won trade and foreign investment. As foreign funds deplete, jobs follow. Local sentiment ranges from anger at the West to despondence.

Successive extreme weather events, combined with over-extraction of freshwater sources and excess pesticide use, decimate rice production in Thailand and Vietnam. Farmer and urban-based groups take to the streets. Sporadic violence breaks out and the Thai government imposes curfews. Violent extremist groups start digging illegal and unlicensed wells, in an effort to attract recruits.

Both governments turn to coal-powered desalination, in defiance of their climate commitments. This move in turn disqualifies Vietnam and Thailand from U.S. and E.U. development assistance. Popular sentiment amongst youth in developing ASEAN turns sharply against the West. A youth-led movement calling for democracy, development and decarbonization captures social media, as publics hold governments accountable for investing in gleaming high-rises at the expense of human rights, equity and environmental justice. Food prices and inflation rise precipitously.

ASEAN is effectively paralyzed. Previous efforts to stand together against Chinese intrusion in Member States’ territorial waters are abandoned. China seizes the opportunity to accelerate militarization in the South China Sea. It begins mooring its fishing fleet in Indonesian and Philippine waters. ASEAN nations not reliant on China for trade or investment condemn these moves rhetorically.
Political rifts within the region deepen when severe weather strikes. Vietnam is hit by devastating floods in spring 2029. The South Korean National Assembly approves a multi-billion-dollar disaster-response-and-rebuild package. China threatens to cut access to its domestic IT market. U.S. military forces arriving in Vietnam in response to the disaster are rebuffed by local protesters. Senior officials seen being ferried to the accompanying U.S. hospital ship are characterized as buffoons in underground art and social media. Meanwhile in the Philippines, U.S. naval ships accompanying other humanitarian assistance vessels are blocked from entry into the port of Batangas by Chinese naval vessels. A standoff ensues, which is soon mirrored by a diplomatic standoff in virtual bilateral talks. Tokyo endures the strongest typhoon to hit the city to date, effectively grounding its disaster response force for days.

With regional governments consumed by food shortages and disaster response, China quietly ramps up its presence in the South China Sea. Reuters publishes satellite imagery showing elevated airstrips being built on 12 distinct islands. Three drilling rigs are also sighted. U.S. attempts to bring the issue to the UN Security Council are predictably blocked by China and Russia.

KEY INDICATORS:

- Deglobalization and climate change stymie economies and send food prices and inflation soaring
- Youth movements and violent extremist groups offer a focus for popular discontent
- Political fractures amongst all regional nations slow humanitarian response and aid delivery
- China uses the political cacophony to reinforce its physical control and military presence around the region

Subi Reef being built by China and transformed into an artificial island, 2015. Under the clauses of the UNCLOS, which the PRC is also a signatory, only the Philippines has the maritime rights to exploit its resources or build structures. UNITED STATES NAVY / WIKIMEDIA COMMONS
SCENARIO 4:
HUNGRY AND HUNKERED DOWN: HIGH FOOD PRICES AND LOW POLITICAL FRAGMENTATION

SUMMARY: The global economy slowly pulls out of its post-COVID slump, but with a strong deglobalization trendline. Previously flourishing trade between the West and developing ASEAN countries remains stalled. Foreign FDI in Southeast Asia rises slightly with investments from Japan, the Republic of Korea, China and Australia. The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) trade agreement also boosts regional trade. When severe weather damages crop yields in 2027, ASEAN summons the political coherence to introduce regional price controls and a national mechanism for strategic reserves to temper anticipated price wars. However, Chinese military dominance in the ever-shrinking fishing grounds in the South China Sea sparks food security concerns.

- Global trade and FDI are significantly replaced by regional trade and FDI.
- A politically cohesive ASEAN responds to impending food crises with uniform rules.
- ASEAN cohesion is not, however, strong enough to counter Chinese dominance of increasingly sparse fish stocks.

DETAILS: As the global economy emerges from its pandemic slump, one prominent change is the tendency to “produce local” – a call-out to both increasing supply chain redundancy (and thus resilience) and responding to hyper-nationalist efforts to keep jobs at home. The slump in FDI from the U.S. and E.U. is a shock to developing ASEAN, but trade and FDI levels are quickly replenished by the entry into force of the CPTPP and reinvigorated investment from Japan, the Republic of Korea, China and Australia.

A bout of severe weather in 2027 lowers crop yield predictions for rice and maize, amongst other staples. ASEAN states dependent upon smallholder farming for both food security and livelihoods brace for a long, difficult winter. Drawing upon lessons from the pandemic era and incorporating satellite- and shared software-based technologies bolstered by artificial intelligence, ASEAN Member States agree presumptively to coordinated management of anticipated food shortages. The plan includes national strategic reserves, regional commodity price controls and – importantly – a mechanism for combating illegal commodities trade.

Anticipatory inflation spikes in 2027, as storms, floods and salination progress even more quickly than predicted. Calls for food aid, jobs, and more resilient urban infrastructure turn into demonstrations and then protests, made up largely of students and unemployed workers. Sporadic violence breaks out when national troops try to quell protests in Myanmar, Cambodia, Thailand and the Philippines.

China is also suffering from severe weather-induced crop damage, as well as eutrophication\(^\text{12}\) from nitrogen pollution, causing inland and marine algal blooms and killing fish stocks. The country responds by moving aggressively into traditional South China Sea and East China Sea fishing grounds, which are themselves quickly depleting from overfishing and ocean acidification. China, which has strict agrochemical regulations, takes no responsibility for eutrophication, pointing to lax rules in the Philippines and Vietnam in particular. Armed Chinese vessels (or “Chinese Coast Guard escort ships”) seal the perimeters to two of the most valuable fishing areas. The Quad, represented by the U.S. and Japan, quickly organizes a novel military exercise meant to demonstrate regional resolve for defending ASEAN Member States Exclusive Economic Zones and the Law of the Sea. The Chinese interpret the exercise as a provocation, and a standoff ensues.

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\(^{12}\) the build-up of nitrogen, phosphorus and other plant nutrients in an aquatic ecosystem, resulting in algal and other microorganism blooms that prevent the light and oxygen absorption necessary for underwater life.
KEY INDICATORS:

- Regional trade and investment becomes inward-looking
- ASEAN political coherence provides some support in a moment of food insecurity, but fails to respond to military threats from China or longer-term climate resilience challenges
- The Quad moves toward becoming de facto defenders of ASEAN marine territorial sovereignty

54th ADB Annual Meeting: ASEAN+3 Finance Ministers and Central Bank Governors Meeting. The ministers and governors discussed recent economic and financial developments in the region and strengthening regional financial cooperation. Asian Development Bank / Flickr
CONCLUSION AND KEY OPPORTUNITIES FOR DEFENSE, DIPLOMACY AND DEVELOPMENT LEADERS

The scenarios shared here are neither predictive nor exhaustive. They do, however, illuminate a range of potential outcomes from the intersection of climate change with fundamental socio-political and economic activity. Focusing on these intersections provides an entry to making diplomatic, defense, development and investment choices which will bolster regional players’ abilities to prepare for or avoid impending threats.

Improvements in climate science have made modeling likely impacts more precise. These models can be a starting point for efforts to anticipate socio-political responses and prevent or prepare for high-risk outcomes.

DEVELOPMENT & DIPLOMACY

Autocratic governments in Southeast Asia have historically overseen uneven economic development, characterized by high GINI coefficients, social inequities and unsustainable exploitation of natural resources. Our experts noted that these tendencies are increasingly being recognized by general publics and questioned by youth movements speaking out for economic and environmental justice. They also pointed out the differing nature of risks facing individuals, indigenous communities, companies and countries, and the wide variety of outcomes for the region as each of these actors feels threatened.

How governments respond to this climate-charged environment will be consequential for the continued peaceful development of the region. Specifically, governments have the opportunity to:

- Halt the criminalization of environmental activism\(^\text{13}\) witnessed in the Philippines, Cambodia, Thailand and elsewhere;
- Equitably and comprehensively enforce regulations to safeguard land and sea territories from unsustainable use;
- Acknowledge the cascading effects climate change will have on food, energy, water, commerce, and other essential infrastructure for modern civilization, and develop an “intersecting systems” approach to analysis and policy development;
- Taking these systems intersections and dependencies into account, implement policies to leverage low-tech and new-tech resilience strategies for agricultural areas, cities and industrial areas. Distribute knowledge and resources broadly to local communities to refine and implement solutions that can scale;
- Recognize that governments will succeed or fail on their ability to provide food security, physical security and a smooth transition to a clean-energy future. Prioritize these areas in both national and regional plans, fully integrating the social and security aspects of impending climate change;
- Select assistance partners that are fully committed to a holistic approach to climate security and a rapid transition to equitable low-carbon development;

• Anticipate an uptick in conflict over scarce resources such as rich agricultural soil and fish stocks in and around the South China Sea. Take steps to institutionalize appropriate dispute mediation and adjudication mechanisms; and

• Invest collectively with neighboring states in large scale adaptive efforts that bolster regional governance bodies’ ability to cope with the turbulent weather and political environment to come.

DEFENSE

Extreme weather can have a threat multiplier\(^{14}\) effect on many sources of sub-national and regional tension. It also consumes military resources required to respond to both natural disasters and potential conflict. With this in mind, regional defense forces should:

• Recognize that the advent of climate-induced crises requires systemic responses to determine the levels of extreme weather, resource depletion or other factors that could trigger adverse security situations;

• Put warning systems in place to mark and help mitigate such threats;

• Equip and train relevant forces;

• Ensure coordination across defense, civilian, and first responder communities to achieve interoperability in emergency response, taking into account recent reference cases (severe weather preparedness in Japan, bushfires in Australia);

• Contribute to whole-of-government communications campaigns for potentially affected populations to help them prepare, prevent and respond when necessary;

• Be aware of the potential for separatist or violent extremist groups to position themselves as providers of aid in times of crisis; and

• Prepare for climate-induced complications in disputed land and sea areas.

While the climate is becoming more unpredictable, these predictions can guide key institutions to make the critical changes needed today. Advances in climate data and resilience planning, if incorporated systematically and equitably in policy, can bolster societal resilience and safeguard peaceful, sustainable development in the South and East China Sea region.

\(^{14}\) The identification of climate change as a threat multiplier was first proposed by the Military Advisory Board of the Center for Naval Analysis, Washington, DC in 2007. Further information can be accessed at https://www.cna.org/mab/reports.
ANNEX 1: CLIMATE SNAPSHOT: SOUTH AND EAST CHINA SEAS

Climate change is already affecting countries, industries and infrastructure across Asia Pacific, with negative implications for human health, livelihoods, and socio-political stability. With more severe climate impacts predicted for the future, the Center for Climate and Security is convening a group of experts to elucidate climate security risk drivers: climate-induced stresses will alter the pursuit of daily life and commerce, with implications for stability and security. Highlighting the cascading effects of climate on the fragile socio-political balance in Asia is the first step in framing and addressing actions to improve security in the region.

CLIMATE PROJECTIONS FOR THE SOUTH AND EAST CHINA SEAS

Projections for the Asian region show accelerated warming over the entire continent. Extreme heat events are very likely to become more intense or frequent in the South and East China Seas. High heat stress days are expected to increase substantially by the mid-century, with substantial growth in days exceeding 35°C (more than 60 days per year by the end of the century for Southeast Asia). This level of heat threatens human health and survival—although heat stress symptoms, including organ failure, can begin at lower temperatures depending on individual health indicators and the level of humidity.

Source: Regional Fact Sheet-Asia, Sixth Assessment Report, Working Group 1, IPCC, 2021.

Data represented in the following 4 paragraphs is taken from AR6, Chapter 12.
Mean precipitation is likely to increase, with total flood damage increasing greatly in river basins in Southeast Asia in the near term. Effects on human lives and livelihoods will be compounded by climate impacts and intense urbanization. At the same time, tropical cyclones are expected to decrease in number but increase in intensity. Community resilience will be a function of both the intensity of extreme weather events and the ability of infrastructure – buildings, roads and bridges, water and wastewater systems, energy grids and the like – to withstand spikes in pressure.

Compound meteorological drought and heat events provoke water stress in agricultural and ecological systems. These have become more frequent, widespread and persistent in China. Going forward, they can be expected to impact farming communities specifically and food security generally.

Sea-level rise is ongoing and expected to continue, with extreme total water levels growing in magnitude and frequency. Coastal flooding will be exacerbated by land subsidence, due to erosion, human-induced fluvial sediment flux and over-use of land-based water resources. Coastal mega-cities, urban and transport infrastructure, and some of the region’s prime agricultural lands will all be affected. In Southeast Asia floods that currently occur once in a hundred years are expected to occur annually by mid-century. At the same time, sandy shorelines are expected to retreat by 10m – 50m. Sea level rise and shoreline retreat have implications for contested islands and marine features, some of which have been recently militarized in the South China Sea. Finally, marine heatwaves are expected to increase significantly in the Southeast Asian region, with potential positive feedback loops into storm severity and further degradation of the marine environment.

Recent scientific publications have shed light on likely climate impacts over the vast marine areas of the South and East China Seas. High-intensity storms could affect human activity from shipping to fishing to oil & gas exploration. Ocean carbon absorption is acidifying sea water, leading to coral bleaching, degradation of fish stocks and a loss in future absorption capacity. An increase in nitrogen deposits of 60% from the 1980’s to the 2000’s is expected to continue. As nitrogen pollution is a cause of global warming, acid rain, and eutrophication (causing algal blooms), it threatens both land-based and sea-based ecosystems, as well as human health, especially along the heavily populated Chinese coastline.

QUESTIONS FOR CONSIDERATION

Given the snapshot of expected physical climate change effects, what are the key socio-political, technological, demographic, diplomatic, military and economic drivers that will shape the climate security risk landscape in the country/region during the next 5 years? Specifically, what are the most important and most uncertain drivers?

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In addition to surface-based risks to oil and gas exploration and facilities, the recent example of Hurricane Ida instigating 55 sub-sea oil spills in the U.S. Gulf of Mexico suggests that sub-sea infrastructure is also at risk from severe storms – with grave implications for marine life.
ANNEX 2: PARTICIPANTS, CLIMATE SECURITY IN THE SOUTH & EAST CHINA SEAS - EXPERTS GROUP

The author and editors are grateful to the experts below for providing input to this publication. At the same time we wish to underscore that we bear ultimate responsibility for the content of this report and the scenarios contained herein.

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