

## IMPACT OF MELTING ARCTIC ROUTES ON THE ASEAN BLUE ECONOMY: CLIMATE CHANGE AND REGIONAL SECURITY CHALLENGES. (2025-2035)

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### ABSTRACT

*As a result of climate change, a new shipping route has been discovered, offering a more efficient transit between Europe and Asia. It is possible due to the melting of Arctic Sea ice. On the contrary, these new global trade routes are prone to improving the trade system, but the ASEAN nations will face a serious issue. The ASEAN nations are dependent upon the maritime points, for example, the South China Sea and the Strait of Malacca. Diminished maritime traffic could potentially impact port activity, transit income, and maritime activities. ASEAN's blue economy is based on ocean resources for development, livelihoods, and other environmental preservation, which is in jeopardy due to these changes. An ASEAN nation's important sector for economic growth is based on maritime tourism and fisheries. It could be negatively impacted by a decrease in vessel traffic and an increase in environmental degradation due to the climatic changes in the Arctic region. As sea level rises as a result of polar ice melting, coastal regions are more prone to floods and ecosystem destruction. Moreover, the security challenges posed by China and Russia, which are increasing their military and geopolitical struggle, are creating regional security challenges as well; they are challenging the maritime sovereignty of ASEAN. It could undermine the United Nations Convention on the Law of the Sea (UNCLOS). A multi-faceted response, strategic development of ASEAN, active engagement in the global climate, a balanced approach to economic development, and environmentally friendly and sustainable opportunities with the geopolitical vision can help ASEAN to protect its maritime future in a world.*

**KEYWORDS:** ASEAN, Arctic Sea, Blue Economy, Climate Change.

### INTRODUCTION

New shipping lanes have been discovered due to the melting of the Arctic Sea ice. Routes between Europe and Asia have been shortened, removing the shipping delays and fuel consumption. It is revolutionising international maritime trade. On the contrary, these changes have important ramifications for the ASEAN countries. The state of Malacca has

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been the most important maritime choke point of Southeast Asia, which plays a vital role in the major trade of the region. The international trade that is redirected through the Arctic causes a risk of losing important transit income and maritime influence of the members of ASEAN. This is an out-of-need for the ASEAN to review its maritime policy to maintain its long-standing position in global marine logistics (Gricius, 2021). The ASEAN blue economy has to promote economic growth, safeguard the marine ecosystem, guarantee livelihood security for coastal inhabitants, and ensure the sustainable use of ocean resources. The redirection of the trade routes, which leads to less maritime traffic, will affect maritime tourism, fisheries, and poverty-based businesses. It will affect nations like Malaysia, Vietnam, and the Philippines, which would hurt port earnings and the associated sector.

On the other hand, the marine ecosystem is endangered due to climate change. The ASEAN countries are at risk of erosion, flooding, and habitat damage as a result of rising sea levels (Pablo Benitez and Avanish Kant). China and Russia increased the military and commercial presence in the Arctic. The turmoil of maritime power is starting to shift, and it is increasing the competition in the region. It is also undermining the UNCLOS. If the dominant powers start controlling emerging sea routes, then ASEAN may find it difficult to defend its maritime rights in the South China Sea. Additionally, it will increase and create a vacuum for other actors to play their role in the ASEAN maritime domain, and a layer of tensions will be created. It may lead Aryan into a larger geopolitical crisis (Trenin, 2020). ASEAN needs to look for strategies for better economic growth and sustainable development without causing any damage to its economic development and the livelihood of the concerned people. An approach is required that should be multifaceted, which will balance the environmental challenges and maintain the growth.

ASEAN should make an investment in renewable energy, green port infrastructure, and sustainable shipping technology, which helps to engage their economic growth in other sectors. It should also increase involvement in environmental climate diplomacy, strengthened by regional cooperation on disaster preparedness and maritime environmental protection. ASEAN can safeguard its blue economy without hastening the melting of the Arctic by advocating for ecocentric policies that strike a balance between trade interests and environmental sustainability (Sinh, 2025). Threats to its traditional sea lanes must be addressed. Economic models must be modified to account for changing trade dynamics. Geopolitical instability must be addressed, and sustainable development policies that take into account global climate obligations must be developed. The Maritime Security Complex (MSC) concept offers a useful perspective for comprehending these interrelated, transregional issues. ASEAN's maritime future will be influenced more and more by events occurring far outside of its local waters as climate change continues to blur geographical borders and connect far-flung locations through strategic and environmental interdependence (Bibi Saira Nouman, 2025).

This study aims to identify the Arctic shipping routes, assess their impact on maritime trade in traditional ASEAN sea lanes, examine how global shipping patterns affect the blue economy of ASEAN member states and contribute to climate change, explore the regional security challenges faced by ASEAN due to increasing Arctic accessibility, and determine the implications of ASEAN strategies for development and progress while minimising the impact on Arctic melting. The research methodology used in this study is

qualitative and falls under the social science category. In order to identify and solve a range of issues and concerns, the study design incorporates descriptive, historical, and explanatory methodologies. The internet, research papers, journals, books, reports, newspapers, and other sources are some examples of secondary sources from which the data is gathered. Due to the development of the Arctic routes, the ASEAN ports, for example, Singapore, Port Klang, and Tanjung Priok, can lose their strategic and commercial importance, which could drastically cut down on shipping times between Asia and Europe (Liu, 2010). The development in this region will cause the blue economy, which is based on the sustainable use of ocean resources, to promote livelihoods, economic growth, and environmental health.

ASEAN states might experience disruptions in economic sectors, investment redirection, and increased competition in shipping logistics if global trade patterns are altered by the Arctic (Rahman, 2022). On the contrary, polar ice melting is a clear sign of increasing climate change, which directly affects ASEAN countries' environments. Low-lying regions like Jakarta and Manila are at risk from rising sea levels and saltwater intrusion, and coastal erosion and extreme weather events are all becoming more common. According to Hoegh-Guldberg (Ecology, 2025), these environmental issues extend beyond conventional ideas of marine security. The geopolitical militarisation of the Arctic exacerbates security problems. The United Nations Convention on the Law of the Sea (UNCLOS), which ASEAN relies on to safeguard its sea lanes and sovereignty, may be weakened if Arctic precedents permit unilateral control over new routes (Tanaka, 2021). ASEAN might thus become entangled in a larger conflict over maritime governance and freedom of navigation.

## CONCEPTUAL FRAMEWORK: MARITIME SECURITY COMPLEX

Climate change-induced sea ice melting is believed to significantly affect the polar region and ASEAN. The Arctic is geographically distant from South Asian states, but a shift in geopolitical economics has brought them together for maritime security and this blue economy. It is now simpler to analyse interrelated security concerns between regional actors and across marine regions when seen through the prism of maritime security concepts. The Maritime Security Complex (MSC) paradigm interrelates interests and risks related to maritime security within specific geographic systems. Shared security concerns, especially with regard to trade routes, marine resources, and strategic sea lanes, bind states within a maritime complex. Given this, developments in the Arctic and ASEAN are a part of a growing global maritime security web that is influenced by geopolitical competition as well as environmental change.

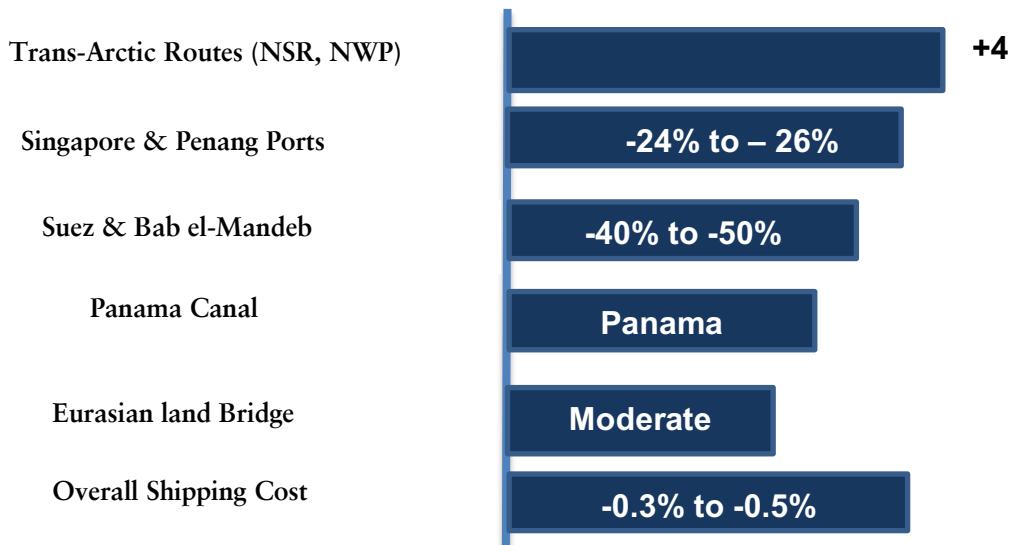
The melting of the Arctic snow opens up vast shipping lanes that facilitate quick, low-cost, and fuel-efficient travel. It would be similar to the future Suez Canal. Singapore, Malaysia, and Vietnam could be disturbed due to trade via this maritime route (Melting Arctic to Open Up New Trade Routes and Geopolitical Flashpoints, 2023). The melting of snow and the construction of new roads will impact the state, leading to a loss of strategic and economic significance. The blue economy, which involves using ocean resources sustainably to boost economic growth and improve livelihoods, is in jeopardy due to the melting of the ice. According to the MSC framework, the situation is known as inter-

regional maritime security interdependence, when changes in one marine zone (Southeast Asia) are influenced by insecurity in another (the Arctic). Sea level rise is also impacting the ASEAN states, as the ecology is deteriorating and having an adverse influence on the environment. Environmental stability and catastrophe resilience are equally as crucial to maritime security as naval might or trade domination, and these climatic risks underscore the non-traditional security threats that transcend state borders and heighten tensions under the MSC.

### IMPACT ON ASEAN SHIPPING PATTERNS

Rising geopolitical competition in the Arctic is beginning to reshape ASEAN's economic, strategic, and diplomatic outlook. As resource extraction in the Arctic gains momentum, changes in global energy markets may deeply affect ASEAN member states. This is particularly true for ASEAN member states like Indonesia, Thailand, and the Philippines, which heavily rely on energy imports. The increasing dependence on Arctic hydrocarbons could shift long-standing trade flows. It potentially disrupts ASEAN's traditional energy partnerships with suppliers in the Middle East and Africa. The melting of Arctic ice has transformed the new geopolitical chessboard, drawing global powers' attention into strategic rivalry. The Arctic region has intensified the competition among global players. It has profound implications for the blue economy and environmental degradation of ASEAN states.

### SHIFTING CONTAINER FLOWS AND REDUCING COSTS



Source: Generated by Authors

## SHIFTING CONTAINER FLOWS AND REDUCING COSTS

Recent simulation of container flows showed that about 4% of total global container flows shift to Trans-Arctic routes (NSR and NWP) when Arctic routes are operational, with sharp reductions along the Panama Canal, Suez Canal, and Malacca Strait routes. In 2050, container volumes passing through Singapore and Penang are likely to decline by around 24–26%. Important water routes like the Suez and Mandeb see flow reduced by 40–50% (Banerjee, 2023). With offshore transport replacing them, railway lines across the Eurasian land bridge also decrease moderately. Resosudarmo mentions in his work that if shippers utilise the Arctic routes rather than the Malacca or Suez channels, ASEAN ports will experience reduced transshipments and traffic, but the cost of shipping overall is lowered by about 0.3 to 0.5 percent in container networks, which benefits shippers through gains in efficiency like shorter distances, less time spent at sea, and reduced fuel usage (Zeng, 2020).

## REDUCED DEPENDENCE ON STRATEGIC CHECKPOINTS

The Malacca Strait, an important chokepoint connecting Southeast Asia and the Indian Ocean trade, is important to ASEAN economies. In ASEAN maritime security, Singapore's Asian-European trade can bypass Malacca if Arctic routes develop, reducing ASEAN's role as a middleman. Shippers can benefit from the diversification by steering clear of geopolitical risk zones (e.g., South China Sea tensions), but it could compromise port traffic, revenues, and logistical firms in transit points in Singapore and Malaysia (Hajra Bibi, 2024).

## IMPROVED TIME AND COST PERFORMANCE

Shipping durations between Asian ports and European markets can be reduced by 35-40% due to NSR. Products reach markets more rapidly by reducing travel time and creating faster supply chains. Furthermore, due to the reduced distance, less fuel consumption means lower operational costs for shipping companies and reduced fuel-based emissions, contributing to global efforts towards logistics sustainability. Apart from these economic and environmental benefits, NSR provides a safe alternative to the Suez and Cape routes. There are risks inherent with relying solely on traditional chokepoints, as evidenced by events such as the 2021 Suez Canal blockage or the ongoing Red Sea unrest. by reducing reliance upon these congested or politically sensitive ports and expanding maritime shipping routes (Hoegh-Guldberg, 2019).

## INFRASTRUCTURE AND DEVELOPMENT OF VESSELS

Minimisation of regional threats by increased application of Arctic shipping corridors demands ice-classed ships, icebreaker escorting – usually served by Russia's state corporation Rosatom – and customised maritime insurance. ASEAN-flagged shipping companies must critically assess these increased operational expenses before utilising these northern routes. Provision of secure, effective, and regulation-compliant navigation under Arctic conditions also demands extensive logistical enhancements. These involve upgrading port facilities, improving voyage planning and crew readiness, and reinforcing coordination with Chinese and Russian maritime authorities.

## CONSTRAINED ADAPTATION TO CURRENT

Major mainstream international carriers remain cautious even as the potential looms. Just around 3 million tonnes of freight used the NSR up to 2024, versus 1.7 billion tonnes on the Suez Canal in 2023. Maersk's Venta Maersk voyage in 2018 remains a rare exception. China's policy towards territorial disputes. The utilisation of NSR is mainly focused on Chinese and Russian specialist operators like New Shipping or Safe Trans due to sanctions as well as the risk of entanglement in geopolitics. Meanwhile, several shipping lines, as well as large international carriers, have vowed to shun Arctic routes because of environmental issues (Lubchenco, 2023).

## ENVIRONMENTAL AND GEOPOLITICAL IMPLICATIONS

For the ASEAN cooperation scheme and economic development to be fully reliant on the ocean is a great challenge. As it was mentioned before, if the impact of climate change is not controlled and mitigated correctly, then deleterious harm to the sea can be caused. At its core, the elements and principles of ASEAN cooperation on the blue economy can be grouped into four main categories. These include sustainable socio-economic development with inclusive opportunities, a focus on food security and livelihoods, the protection and restoration of coastal and marine ecosystems, and the formulation of national and regional blue economy policies with transboundary resource management. Although well-rounded, the basic idea of blue economy cooperation is vulnerable to the risk of climate change's impact on the sea.

## ECOSYSTEM HAZARDS IN A VULNERABLE AREA

The opening of Arctic Sea routes increases environmental risks in an already fragile ecosystem. Oil and fuel spills in remote, ice-covered waters are extremely hard to manage and can cause lasting negative ecological damage. The subsistence lifestyles of indigenous communities are impacted by increased noise, emissions, and shipping disturbance, which also endangers Arctic wildlife like polar bears, walruses, and narwhals. As maritime activity grows (for instance, over 36 million tonnes of cargo passed through the Northern Sea Route in 2023), it places added stress on coastal infrastructure, eroding shorelines, thawing permafrost, and impacting marine biodiversity. The area faces more severe environmental, logistical, and geopolitical difficulties because of invasive species, climate change, black carbon emissions, diminished sea ice, and maritime accidents (Essallamy, 2008).

## SECURITY AND SOVEREIGNTY TENSIONS

In already tense regions like the South China Sea, East China Sea, and nearby naval corridors, increased maritime traffic via the NSR may intensify power struggles, put current maritime norms to the test, and even worsen the existing conflicts.

## INCREASED WARMING AND RAPID ICE LOSS

Rise in black carbon emissions and industrial activity in the Arctic shipping accelerates the decline of sea ice and local warming. The natural albedo effect of the region is weakened, which intensifies the planetary climate feedback mechanisms and reduces the

ability to reflect solar radiation. Arctic regulatory influence on global temperatures is disrupted by diminishing ice covers, which further contribute to destabilised weather patterns across mid-latitudes. This has a direct link to severe storms, extended heatwaves, altered monsoon systems, and harsher winters. As such, expanding Arctic activity not only signals the effects of climate change but also actively reinforces its dangerous trajectory (Rahmstorf, 2024).

## GAPS IN REGULATION AND INTERNATIONAL COOPERATION

The Ilulissat Declaration of 2008 was a collective legal framework between Arctic nations. Broader global communication becomes increasingly vital as melting ice opens maritime routes. Countries are not geographically part of the Arctic; they are nonetheless essential stakeholders. As these new routes are being used by them, ASEAN countries must play a part in promoting multilateral government, supporting climate resilience, and encouraging an inclusive framework that ensures sustainable Arctic engagement (Jian).

## SHAPING REGIONAL SECURITY CHALLENGES FOR ASEAN

The safety and prosperity of Southeast Asia are heavily dependent on maritime security. A crucial role in maritime geography is played by the region's economic stability and growth. Therefore, ASEAN needs to work on addressing regional traditional and non-traditional security threats. "Traditional Security Threats" consists of infringements on a state's sovereignty and military. "Non-Traditional Security Threats" mostly contain armed ship robbery, illicit substances, and human and small arms trafficking. To eliminate other threats to the marine ecosystem, the focus should be on problems like global warming, force majeure, and illegal, unreported, and unregulated (IUU) fishing.

## GLOBAL POWER RIVALRIES AND EXPANDING INFLUENCE

The Arctic zone has become a critical strategic area where major powers are escalating their military and economic adventures as well. Russia and China are on a single page and increasing their collaboration in the region (RSIS, 2024). The 2023 joint naval drill in the Sea of Japan involved warships and various aircraft, which was designed to strengthen defence ties between the two countries. China has invested a huge amount in Arctic energy infrastructure. Its further ambition is to hold 30% of Russia's Yamal LNG project. These developments are crystal-clear events that identify the increasing interest of major powers in Arctic resources and transport routes (Toan, 2014). On the contrary, the United States and NATO enhanced their regional presence in Arctic routes. Recently, the US Navy has initiated regular surveillance and freedom of navigation operations in Arctic waters and reactivated the Second Fleet. The US's main focus is on the High North border geopolitical operations, further extending towards Asia with significant implications for ASEAN. ASEAN states are more vulnerable due to Arctic rivalries, considering the Indo-Pacific maritime routes. The presence of power dynamics in the Arctic region has a significant impact on the regional security and global strategy, as Southeast Asia has entered into a new strategic friction.

### **ASEAN's Neutrality Tested by Great Power Pressures**

ASEAN is struggling to maintain a balance and neutral stance, as it is committed to traditional non-alignment agreements to control strategic competition. The ambition of China to declare itself as a “near-Arctic state” and its increasing participation in Arctic Council Affairs have put more pressure on other major powers. On the other hand, the US, along with its allies, has intensified Indo-Pacific initiatives known as Quad and AUKUS. These major developments will directly create strategic competition and pressure on ASEAN states to take serious steps. Moreover, the US is trying to hijack the multilateral platform where global agreements intersect with Arctic issues, such as UNCLOS and the Paris Climate Accord. The development in the Arctic region is tied to border maritime disputes. ASEAN states are forced to engage in defence cooperation or take part in the conflicts that are beyond their immediate region.

### **ARCTIC MELTING'S CHAIN REACTION IN SOUTHEAST ASIA**

The melting of Arctic routes has a significant effect on the global environment, increasing challenges for Southeast Asia. Recent changes, such as rising sea levels, transformations in ocean currents, and shifts in monsoon cycles, mainly in the Atlantic Meridional Overturning, are directly interlinked with Arctic routes. The chaos and damage that occur in over 650 million residents in Southeast Asia are the most vulnerable areas. Coastal areas like Jakarta, Bangkok, and Manila are under major threat from floods and land subsidence. The Intergovernmental Panel on Climate Change (IPCC) warns that if emissions remain unchecked, the sea level could rise by 1.1 metres by the end of the century (Cole, 2018). Environmental issues can damage the key sectors such as agriculture and fisheries. Delta saltwater has destroyed the rice yields due to warming sea levels, and fish stock is vital to regional food security. The unpredictability in climate and environmental shifts has built more tensions for the ASEAN states (Pritha Datta, 2023).

### **REGIONAL FRAMEWORKS AND NONTRADITIONAL THREATS**

ASEAN has established a framework known as the ASEAN Agreement on Disaster Management and Emergency Response. This body's main function is still limited in scope and does not account for Arctic-linked environmental disruptions. Several incidents show Arctic ice is melting, and it is a significant challenge for the ASEAN defence. As of 2024, no ASEAN member state has formally integrated climate security into its military doctrine, leaving the region underprepared for transboundary environmental threats driven by distant but interconnected Arctic changes (Maldonado).

### **ENVIRONMENTAL REGULATION AND COMPETITIVE RESOURCE ACCESS**

The current environmental changes and rising temperature in the Arctic have forced people to migrate and increased internal unrest among ASEAN states. Climate change, security, and regional cooperation in ASEAN work that extreme weather and rising sea levels have led to the displacement of ten million people across Asia. According to the data reported by the World Bank, 13 million people in Bangladesh might be forced to displace due to climate-related reasons by 2050. Coastal degradation and marine resources are

declining and pushing rural communities and increasing pressure on the urban areas, which are already suffering from infrastructure problems. Countries like Indonesia and Vietnam are more vulnerable to such threats. ASEAN may find challenges in responding to regional conflict, as well as these rapidly evolving humanitarian and environmental crises. Furthermore, the internal displacement and competition over resources have intensified the regional conflict (Denmark, 2021).

### MANAGING SHARED ECOSYSTEMS IN THE GLOBAL COMMONS

While the Arctic is a part of the law under the United Nations Convention on the Law of the Sea (UNCLOS), it does not have its own specialised environmental protection regime comparable to the 1959 Antarctic Treaty System. The legal vacuum exposes the region to uninhibited industrial activity. The melting of Arctic ice, oil and gas exploration, shipping emissions, and the introduction of non-native species constitute transboundary risks. For instance, the Northern Sea Route has recorded more than 130 successful transits in 2023—a significant increase from less than 10 a decade ago. ASEAN migratory routes involve Arctic breeding and shorebirds in Singapore. They are more exposed to tainted marine currents. The environmental destruction has increasingly affected biodiversity, fisheries, and marine health, and without strong support and multilateral protection, ASEAN might fail to bring stability to the region (Clement, 2021).

### SUSTAINABLE FISHERIES AND INVASIVE SPECIES

With Arctic shipping lanes being more active, the risk of invasive species spreading throughout the water increases. Non-native organisms can be unknowingly released in Asian waters, which may disrupt the ecosystem. Over 50 million people in ASEAN coastlines are dependent on these water bodies for their livelihood. Dependent people are also facing problems due to climate change and overfishing. Alien species further destabilise the marine system. These risks could be further intensified if sticker rules and water regulations are not observed (Geiling, 2014).

### ASEAN CLIMATE-SECURITY DIPLOMACY NEEDED

ASEAN has not pushed forward any sort of formal proposals regarding environmental implications. More than 50% of this region's population relies on maritime resources. However, it still has a limited participation in International Maritime Environmental Standards. Organisations like the Southeast Asia Council Society have called on ASEAN to administer responsible naval exercises.

### EXPANDING MILITARY BEYOND THE ARCTIC

The rising military presence in the Arctic, with China expanding polar capabilities. Russia's new installations and deepened Western defence movements reflect an extensive strategic repositioning that spreads into Southeast Asia. These Arctic expansions are restructuring global threat perceptions and influencing military strategies worldwide.

## NON-TRADITIONAL SECURITY PRESSURES

For intelligence activities in the Arctic, Russia's use of civilian vessels has covered the line between commercial and military operations. They are increasing the probability of investigation events and potential conflict. Comparable grey-zone tactics are faced by Southeast Asian coastal nations in disputed naval areas. ASEAN can strengthen its naval security by enhancing inter-agency coordination by investigating these Arctic practices. By implementing more robust safety protocols and improving the ability to detect and respond to underground or ambiguous naval threats.

## CONCLUSION

ASEAN will be significantly impacted by the way that global maritime trade is changing as a result of the melting of Arctic Sea ice and the opening of new shipping lanes, especially the Northern Sea Route and Transpolar Passage. Important conclusions include:

- By using Arctic routes instead, ships may be able to avoid major chokepoints in Southeast Asia, such as the South China Sea and the Strait of Malacca.
- The blue economy of ASEAN, which depends on port services, maritime tourism, and fisheries, is at risk. The decline in commerce and environmental deterioration are jeopardising economic growth. Particularly in low-lying nations like Vietnam and the Philippines.
- International maritime standards under UNCLOS could be jeopardised by the growing militarisation of the Arctic by superpowers like China and Russia.
- It is clear from the Maritime Security Complex (MSC) concept that developments in the Arctic are connected to maritime security in Southeast Asia. A transregional security web is created as a result of strategic rivalry and economic upheavals in one way or another.

## FUTURE SCENARIOS (2025–2035)

### ➤ COOPERATIVE GOVERNANCE AND GREEN MARITIME TRANSITION

By 2035, strong multilateral accords will regulate Arctic navigation, and international players, including ASEAN, will have adopted ecologically conscious policies. ASEAN engages in Arctic forums like the Arctic Council (as observers), makes investments in green port infrastructure, and shifts to sustainable marine practices.

### ➤ STRATEGIC RIVALRIES AND ENVIRONMENTAL COLLAPSE

As major powers exert unilateral control over marine routes, the militarisation of the Arctic is intensifying. ASEAN's maritime claims in disputed regions, such as the South China Sea, are at risk due to the precedent set by the weakening of UNCLOS. In ASEAN, coastal residents are being displaced by increasing sea levels, and environmental deterioration is accelerating. Floods are common in port cities like Jakarta and Ho Chi Minh City. ASEAN's blue economy sectors collapse as a result of ecosystem losses and investor withdrawal, and maritime commerce volume drops precipitously.

➤ **MOST LIKELY SCENARIO: PARTIAL ADAPTATION AMID RISING RISKS**

Diversifying port operations and bolstering regional disaster management systems are two examples of ASEAN's modest adaptation measures. However, because of geopolitical divisions, collective action is still slow. ASEAN's proportion in the world's maritime trade is declining as a result of the steady increase in Arctic traffic. Disruptions brought on by climate change are becoming more frequent, particularly in ASEAN coastal states, but complete collapse of maritime order is prevented by international cooperation. Though stretched, ASEAN's blue economy endures, and policy innovation continues to be reactive rather than proactive.

## RECOMMENDATIONS

➤ **DEVELOP GREEN PORT INFRASTRUCTURE AND DIVERSIFY PORT SERVICES**

To attract sustainable shipping, ASEAN has to update port infrastructure with eco-friendly fuels, digital logistics, and low-emission technologies. Green marine hubs that comply with international environmental standards and reduce emissions from port operations might be modelled after nations such as Singapore.

➤ **STRENGTHEN ASEAN'S VOICE IN ARCTIC AND CLIMATE GOVERNANCE**

Despite not being Arctic states, ASEAN members ought to make use of their observer status in Arctic forums and engage in UN climate talks to promote responsible Arctic governance and its connection to the effects of tropical marine environments. Protecting UNCLOS and thwarting unilateral territorial claims must be the main goals of diplomacy.

➤ **PROMOTE REGIONAL BLUE ECONOMY RESILIENCE**

Member nations should fund sustainable fisheries, marine protected areas, and climate-resilient coastal infrastructure through ASEAN's Blue Economy Framework. Small economies that are susceptible to calamities brought on by climate change can be supported by regional funds or insurance systems.

➤ **ENHANCE MARITIME SECURITY COOPERATION UNDER THE MSC FRAMEWORK**

By increasing coordinated naval patrols, exchanging maritime intelligence, and holding climate-focused maritime security exercises, ASEAN should embrace a collective maritime security strategy. This kind of collaboration can control common environmental hazards and discourage outside violence.

➤ **MAINSTREAM CLIMATE ADAPTATION IN NATIONAL DEVELOPMENT PLANS**

Disaster response, flood risk mapping, and sea level rise estimates should all be incorporated into national development plans for ASEAN countries. Resilience against

erosion, displacement, and salinisation must be given top priority in coastal city urban development.

## DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s).

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