



## Combating the Rising Sea Levels in South Asia

ASEAN+

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## Introduction

The notion that climate change is a distant prospect, has repeatedly been overturned in recent years. This certainly holds true to the rise of sea levels globally, but pertinently in South Asia. Primarily caused by two factors, melting ice sheets and glaciers, and thermal expansion of warming water. Simply put, global warming is at the forefront of discussion regarding sea levels rising and is inextricably linked. Growing economies and trade have caused a rippling effect, with an increase in emissions (among other factors) eventually leading to sea levels rising. This report aims to provide clear and concise insight into the causes and effects of sea-level rise in South and South-East Asia.

## Definition of Key Terms

### **Association of Southeast Asian Nations (ASEAN)**

ASEAN is a political and economic union of 10 member states established in 1967. The initial union included the 5 founders: Indonesia, Malaysia, Philippines, Singapore and Thailand. Brunei, Vietnam, Lao PDR, Myanmar, and Cambodia joined ASEAN in the following years. The union has many aims, which are outlined in the ASEAN Declaration<sup>1</sup>, namely the acceleration of economic growth, social progress and cultural development.

### **Intergovernmental Panel on Climate Change (IPCC)**

A United Nations body, created in 1988, has 195 Member countries. The panel is tasked with assessing the state of knowledge on climate change and identifying agreement with the scientific community. The IPCC also highlights areas where further research is needed, as the body itself does not conduct research. The IPCC publishes assessment reports, however remains a transparent and neutral body.

### **Conference of the Parties (COP)**

A United Nations climate change conference with an annual summit. Over recent years, the COP pacts have been in the spotlight in regard to the failure of the 2015 Paris Agreement or COP21 pact, as well as the newly signed COP26 Glasgow Climate Pact in 2021. Much like most UN resolutions, COP Agreements are not binding. The conferences negotiate many facets of climate change, and actions nations should take to mitigate catastrophic climate conditions, most notably global temperature rises. The Paris agreement aimed to have a rise of only 1.5 degrees, to much dismay after negotiations, this value remains the same in the Glasgow Climate Pact.

### **Global warming**

Refers specifically to an increase in the average temperature of air and water on earth caused by human activities, such as the burning of fossil fuels. Leading to an



increase of heat-trapping greenhouse gasses in the atmosphere, this phenomenon, in particular, is called the 'greenhouse effect'. The three most abundant gasses are water vapour, carbon dioxide and methane.

### **Climate Change**

Climate change is the long-term change in average weather patterns that define regional and global climates. Including changes in normal temperature ranges, seasonal timings, and natural phenomena such as typhoons or hurricanes. It also includes natural processes that contribute to warming or weather changes. Global warming can be considered a factor for climate change to occur.

### **Anthropogenic Climate Change**

Refers to human-induced climate variation, directly linked to the burning of fossil fuels, aerosols released and land alterations (such as deforestation). Activities such as mining, and the release of industrial waste are also anthropogenic.

### **Thermal expansion**

As water heats up, it expands. This is becoming increasingly common in ocean waters.

### **Emissions**

Refers to the production and release of greenhouse gasses, including carbon dioxide and methane, into the atmosphere. Normally as a result of the burning of coal and fossil fuels.

## **General Overview**

The rise of sea levels is a complex issue, inextricably linked with other large concerns of the world today. As such global warming and anthropogenic activities have dire consequences for water rising.

Carbon dioxide is commonly emitted from the burning of coal and fossil fuels. The sharp increase in Carbon dioxide emissions poses great threats for further global warming. Asia is the largest CO<sub>2</sub> emitter, responsible for around 53% globally; China alone emits 27% or around 9.8 billion tonnes (according to a 2017 figure). The reliance on coal and fossil fuels, in countries like China and India, for the stability and growth of their economies is still too large of a concern. This is also applicable to South-East Asian nations, which are swiftly developing, namely Indonesia, Thailand and Vietnam. This has perpetuated the use of non-renewable energy sources for their growing populations and markets. Consequently, atmospheric carbon dioxide is on the rise, in 2020 a record high of 412.5 parts per million of CO<sub>2</sub> was documented, despite economic declines due to the Pandemic. This not only lowers ocean pH levels through absorbed CO<sub>2</sub> for more acidic waters but also greatly increases the



carbon dioxide trapping heat in the atmosphere, therefore worsening the greenhouse effect.

The greenhouse effect has caused the earth's temperature to rise rapidly; 2020 was recorded as the second warmest year since 1880. Further, the ten warmest years on record have occurred since 2005. The UN Intergovernmental Panel on Climate Change (IPCC) sixth assessment report stated that the Indian ocean has warmed faster than the global average and predicted an increase in marine heatwaves in Asia. Consequently, leading to the melting of ice sheets and glaciers in the Antarctic, which is becoming increasingly thinner often less than a meter thick. In comparison, arctic ice sheets are around 3 to 4 meters thick. The influx of large amounts of fresh water, which isn't able to refreeze in the winter due to global warming, has extreme ramifications. Freshwater changes ocean salinity, which alters the density of seawater. Variation in density can impact ocean currents, leading to a build-up of water in coastal regions, further exacerbated by the gravitational attraction of seawater to coasts. Experts debate whether the rise of sea levels through this phenomenon is reversible.

The melting of ice sheets and glaciers poses another threat in the possible perpetration of this cycle, as large reserves of methane are released. Methane is an extremely potent greenhouse gas, approximately 30 times more efficient than carbon dioxide. Thus, an increase in methane leaks from melted ice sheets introduces more greenhouse gasses that contribute to global warming. Moreover, thermal expansion of water results in a further sea-level increase. Some studies suggest around 50% of sea-level rise could be attributed to thermal expansion.

The direst consequences of sea levels rising in South Asia are the risk of land loss and the displacement of large populations. Indonesia, an island nation may face serious impacts. Records show that the North Indian Ocean has experienced up to an 8mm rise per year, with economic activity centres in coastal cities, millions in its population are vulnerable to flooding and land loss. The highest changes were found on the coasts of Jakarta where sea level trends were four to five times larger than surrounding waters. The IPCC predicts that by 2100, sea levels on its coast will have risen by 80cm, however other studies predict that thermosteric impacts will mean a 1 to 2-meter rise of sea levels in Indonesia. Despite this, not all of these are from the direct impact of anthropogenic activities. Indonesia sits atop extremely active tectonic plates, and some changes in sea level are caused by their movement, however, they still do not majorly contribute to the trends of swiftly rising sea levels in the region.

Meanwhile, in Thailand, 13 tide gauge systems revealed that there is a 5mm/year sea-level rise. Effecting three times more people than previously thought by 2050. Research studies predicted that land hosting over 150 million is a risk to being under the high-tide line by the mid-century mark. Around 10% of the Thai population lives on land expected to be inundated(flooded), and around 40% of Bangkok.

Vietnam as well as anticipating several blows, some project that Southern Vietnam could be entirely submerged. Resulting in around 20 million people, one-quarter of the Vietnamese population, living on inundated land. Over the last 5 decades, coastal regions in Vietnam have seen a 20cm sea-level rise. The Mekong River Delta, home to more than 20 million, is responsible for almost half of the country's rice production, the submergence of this land will effectively destroy a large sector of the Vietnamese economy, not to mention the massive loss of livelihoods. Vietnam has plans of borrowing approximately US \$2 billion to develop the delta in a sustainable manner, as of discussion at COP26. Moreover, Vietnam has initiated multiple projects to prevent flooding in light of the sea level rising.



Figure 1A man paddles a boat through a flooded village in Hanoi, Vietnam, July 31, 2018 (AP photo by Manh Thang).

India, although also a major contributor to global warming is bound to witness disastrous rises in sea levels in its coastal regions, around 0.1 to 0.3 meters in the next 2 to 3 decades. Using a combination of IPCC reports and a NASA simulation, 12 coastal cities (which were predicted to be submerged by the end of the century) in India were studied. It found that the cities of Mumbai, Kochi (alternatively Cochin), and Chennai were to see 0.17m, 0.22m, and 0.16m of rising by 2050 respectively. The three cities have a combined population of about 26 million, this alone illustrates the immense impact the flooding or submergence of coastal areas will have. The study also calculated figures of rising sea levels, should net-zero goals be achieved by the mid-century, unfortunately, these figures were mere millimetres lower than those predicted by current emission levels, again highlighting the severe consequences already set in motion. Moreover, much of India's trade is reliant on ports located in these 3 cities, increasing the economic burden the country must face if the rise of sea levels is not controlled.

Rising sea levels are impacting all South and South-East Asian countries. It is an international concern, as it endangers million in population and can have dire consequences on economies, inland habitats as and natural resources in countries. Some experts have also suggested the strong effects sea levels would have on geopolitics and possible warfare in acquiring resources once an increased amount of land is submerged, posing a major security threat as well. All in all, governments must now agree to work to solve the issue, instead of brushing it under the carpet.



## Major Parties Involved

### China

Responsible for almost 30% of global emissions, China must make large strides towards an environmentally responsible and sustainable economy. Apart from their emissions, China has initiated infrastructure utilizing renewable resources, but it is still very heavily dependent on coal. Like other nations, it also risks a very large population in its coastal areas, also predicted to submerge in the coming decade, posing a great threat to millions of livelihoods. Despite this, at COP26 China was unwilling to sign a strict agreement.

### India

Similarly, India is also a large CO<sub>2</sub> emitter and was unwilling to sign a strict version of the recent COP26 agreements. This could have dire consequences for nearly half a billion people who live in or near coastal areas in the country. Should India not find ways to mitigate predicted sea level rises, it will carry heavy burdens with the possibility of damaging their economy and vast amounts of natural resources.

### Indonesia

The island nation has attempted to make strives to reduce sea level rises, however with its large and growing population arise a number of social and economic complications. Moreover, there is a serious risk of their capital Jakarta sinking, as of current predictions, which could jeopardize the rapidly growing Indonesian economic and social prosperity.

### Thailand

Thailand is heavily reliant on its coasts, especially for tourism which contributes to around 20% of their economy (pre-pandemic). Thus maintaining its coastlines and the security of coastal regions is crucial for Thailand to continue growing.

### Vietnam

In Vietnam, the risk of land loss is vital to control, as much of the population is dependent on coastal activities for their livelihoods. The increased risk of flooding for the already low-lying nation could prove to be a fatal economic blow.

### Philippines

The country faces a sea-level rise of around 12.1mm per year in Manila Bay, not only 4 times the global average, but also jeopardizing the livelihoods of almost 12 million citizens that live in its coastal population. This could have dire consequences for the growing Pilipino economy.



### **weADAPT**

Is a UK based Climate change adaptation planning, research and practice NGO. The organisation launched their Sea Level Rise foundation in 2007, and researches mechanisms to protect island states or low-lying areas from the rise of sea levels.

## Timeline of Key Events

17 <sup>th</sup> April 2007	UNSC holds first-ever debate on Impact of Climate Change on Peace.
December 12 <sup>th</sup> 2015	Paris Agreement Signed by 196 parties
September 19 <sup>th</sup> 2019	Report from the IPCC declaring worse than expected situations
2020	Rate of sea-level rise per year declared to have more than doubled than in the 20 <sup>th</sup> century
August 9 <sup>th</sup> 2021	IPCC Sixth Assessment report declare higher sea levels
October 18 <sup>th</sup> 2021	UNSC Arria-Formula Meeting on Rising Sea Levels and Implications for International Peace and Security
November 13 <sup>th</sup> 2021	COP26 signed by 197 countries

## Previous attempts to resolve the issue

### **Paris Agreement**

Also known as COP21, had 196 signatories, to significantly reduce greenhouse gas emissions and aim for only 1.5 degrees Celsius warming. It was agreed to review commitments every 5 years, and that developing countries have access to financing to help solve some of the issues at hand. However, many countries did not adhere to the guidelines of the agreement. Although the Paris Agreement marked a conscious recognition and willingness to shift to net-zero emissions, in reality, lacked action and implementation by many.

### **COP26 – Glasgow Climate Pact**

The conference took place in Glasgow in late 2021. It held much discussion of further implementation and the shortcoming in past implementation in line with the Paris agreement. The pact is said to be a large compromise, with the use of softer terms. The UN's Secretary-General went as far as to say it is "not enough". China and India, two of the largest emitters, were unwilling to sign a harsher pact.



### **UN Security Council Arria-Formula meeting**

Arria formula meetings discuss issues of peace and security with UNSC members, however is regarded as more informal and take place outside the Security council chamber. Vietnam convened the meeting, which took place on the 18<sup>th</sup> of October 2021, discussing the impact of the Seventh IPCC report. Although a draft resolution was vetoed by the Russian Federation, it incited conversation and debate in a number of countries. This included the topic being discussed in presidential debates, namely in Ireland, Niger and the UK.

## Possible Solutions

Although a difficult task, establishing methods of decreasing carbon emissions is an important task to resolve the issue. This can be done in many ways, government-imposed emission limits or cuts, or through the building of more sustainable infrastructure in countries that are extremely reliant on coal and fossil fuels. Scientists hope to decrease global warming to only 1.5 degrees Celsius, however, this goal is often rendered impossible, as people are sceptical of its effects can be slowed down- let alone reversed. However, it is crucial to develop viable infrastructures and policies to decrease global warming in the long run.

Much of the emissions in question are due to densely packed cities that require massive amounts of energy to function. The move to cleaner energy sources in cities can have an immense impact on the total emissions of countries.

The development and building of coastal infrastructure, to prevent a loss of livelihoods, through sea walls or beach barriers that protect settlements from a rise in sea level or from storms and weather abnormalities caused due to climate change.

Despite being extremely expensive and difficult, the relocation of populations to more inland areas can be an extremely protective measure. This decreases pressures on the coastline and puts fewer people at risk in the event of drastic sea-level rises. This ultimately, may not be feasible for all countries, especially those who are heavily reliant on their ports and coastlines for stable economies.

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