Forum: Environmental Committee

Issue: The impact of rising sea levels in the Asia-Pacific zone

Student Officer: Bill Derpanopoulos

Position: Co-Chair

INTRODUCTION

With the emergence of climate change, the world has been faced with many new problems, one of which is rising sea levels. Rising sea levels pose a significant risk to coastal and island communities worldwide. One such coastal region in danger is the Asia-Pacific zone; with its vast and densely populated coastlines and numerous low-lying island nations this zone is particularly vulnerable to rising sea levels.

The Asia-Pacific zone is home to more than half of the world's population and is already experiencing the detrimental effects of rising sea levels impacting millions of people, economies, and ecosystems.

As humans continue to pour greenhouse gases into the atmosphere, oceans have tempered the effect. The rise in sea levels is expected to continue beyond the year 2100, even if greenhouse gas emissions are stabilized today.

According to a World Bank Study, an area of approximately 74,000 square kilometres in the Asia-Pacific zone would risk permanent inundation by a one-meter sea level rise, displacing 37 million people. Furthermore, as the region is also accustomed to cyclones, the effects will be even more devastating. With bigger storm surges due to rising sea levels more destruction will be caused in the region and surges will move further inland and overwhelm larger areas.

The consequences of these changes are destructive erosion in the areas affected, wetland flooding, aquifer and agricultural soil contamination with salt, which presents a threat to food security, and public health, and lost habitat for fish, birds, and plants.

To combat this problem, many coastal cities are already planning adaptation measures to cope with the long-term prospects of higher sea levels, often at considerable cost. Building seawalls, rethinking roads as dams, and planting mangroves or other vegetation to absorb water are all being undertaken.

With billions of dollars contributed to combating rising sea levels addressing the issue requires a comprehensive and collaborative approach that includes robust scientific research, innovative adaptation strategies, and effective international cooperation. Mitigation efforts to reduce greenhouse gas emissions are crucial, but so too are adaptation measures that enhance the resilience of communities and ecosystems to the changes that are already underway.

DEFINITION OF KEY-TERMS

Rising Sea Levels

The increase in the average level of the world's oceans due to climate change, is primarily caused by the thermal expansion of seawater as it warms and the melting of ice sheets and glaciers. Rising sea levels lead to various environmental, economic, and social challenges concerning the Asia-Pacific zone.

Global mean sea levels (GMSL)[1]

Global mean sea level is the average height of the entire ocean surface. Global mean sea level rise is caused primarily by two factors related to global warming: the added water from melting land-based ice sheets and glaciers and the expansion of seawater as it warms.

Thermal Expansion

The increase in the volume of seawater as it warms contributes to rising sea levels. It is a major factor in sea level rise, exacerbating the impacts on the Asia-Pacific region.

Glacier and Ice Sheet Melting

The process of glaciers and ice sheets losing ice mass due to higher temperatures adds more water to the oceans. This process directly contributes to sea level rise, affecting coastal communities in the Asia-Pacific zone.

Asia-Pacific Zone[2]

The Asia–Pacific (APAC) is the region of the world adjoining the western Pacific Ocean. The region's precise boundaries vary depending on context. In accordance with the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the Asia–Pacific region includes a total of 51 countries, which include: Australia, Bangladesh, Brunei, Cambodia, People's Republic of China, Micronesia, Democratic People's Republic of Korea, Philippines, The Russian Federation, Republic of Korea, Sri Lanka, Thailand, The Democratic Republic of Timor-Leste, Vietnam, United States of America.

Coastal Erosion

The wearing away of land and removal of beach or dune sediments by wave action, tidal currents, and rising sea levels. Coastal erosion threatens infrastructure, livelihoods, and ecosystems in the Asia-Pacific region.

[1] https://sealevel.nasa.gov/understanding-sea-level/key-indicators/global-mean-sea-level/ Accessed 30 July 2024.
[2] https://en.wikipedia.org/wiki/Asia%E2%80%93Pacific & https://dkiapcss.edu/about/ap-countries/ Accessed 30 July 2024.

Salinization[3]

Salinization is the increase of salt concentration in soil and is, in most cases, caused by dissolved salts in the water supply. This supply of water can be caused by flooding of the land by seawater, seepage of seawater or brackish groundwater through the soil from below. Salinization affects agriculture and water supply in low-lying coastal areas of the Asia-Pacific zone.

Climate Refugees

People who are forced to leave their homes due to the impacts of climate change, including rising sea levels. The Asia-Pacific zone may see an increase in climate refugees as rising sea levels make certain areas uninhabitable.

Environmental Justice

All people must be treated fairly and given the opportunity to actively participate in the development, adoption, and implementation of environmental regulations, and policies in order for there to be environmental justice. Moreover, it implies that no society is disproportionately impacted by the adverse environmental effects brought on by commercial, municipal, and industrial operations or by the application of national, state, and local laws, rules, and policies.

BACKGROUND INFORMATION

Sea Level Rise

Global mean sea level (GMSL) provides an integrative measure of the state of the climate system, encompassing both the ocean and cryosphere (ice-covered portions of Earth), and it can be viewed as an important indicator of what is happening to the climate in the present and what may happen in the future. Long-term changes in global mean sea level (GMSL) are predominantly driven by three processes:

Ice Melt: Due to the warming atmosphere and ocean, ice sheets and mountain glaciers are melting, resulting in the addition of freshwater into the ocean.

Thermal Expansion: Ocean water expands as it absorbs trapped heat, causing sea levels to rise.

Land Water Storage: Water that is either removed from land (through groundwater pumping, for example) or impounded on land (through dam building, for example) can cause a net change in the total water found in the ocean.

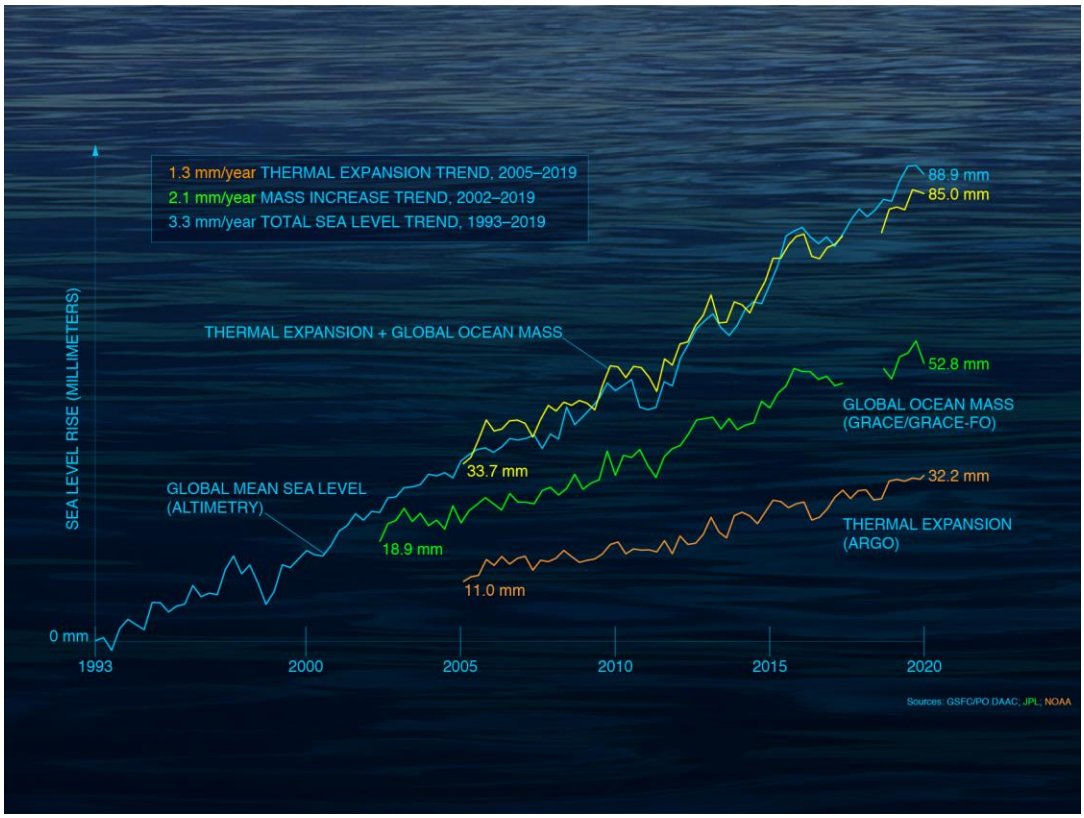
Based on a study by IPCC (The Intergovernmental Panel on Climate Change), the sum of glacier and ice sheet contributions is now the dominant source of GMSL rise. Non-climatic anthropogenic drivers, including recent and historical demographic and settlement trends and

[3] https://www.salineagricultureworldwide.com/salinization#:~:text=a%20great%20challenge.-,What%20is%20salinization%3F,through%20the%20soil%20from%20below Accessed 30 July 2024.

anthropogenic subsidence, have played an important role in increasing low-lying coastal communities' exposure and vulnerability to sea level rise (SLR) and extreme sea level (ESL) events. Coastal ecosystems are already impacted by the combination of SLR, other climate-related ocean changes, and adverse effects from human activities on ocean and land. Attributing such impacts to SLR, however, remains challenging due to the influence of other climate-related and non-climatic drivers such as infrastructure development and human-induced habitat degradation. A diversity of adaptation responses to coastal

The expected impacts of SLR on coastal ecosystems over the course of the century include habitat contraction, loss of functionality and biodiversity, and lateral and inland migration. Impacts will be exacerbated in cases of land reclamation and in such areas, where anthropogenic barriers prevent inland migration of marshes and mangroves and limit the availability and relocation of sediment. The Asia-Pacific region is home to numerous low-lying coastal areas and small island nations and is especially vulnerable to these changes, for example, in Bangladesh, saltwater intrusion has contaminated freshwater sources, affecting agriculture and drinking water supplies. Furthermore, in Jakarta, Indonesia, frequent flooding due to rising sea levels has damaged infrastructure, prompting plans to relocate the capital city.

In a nutshell, the IPCC predicts that in the absence of adaptation more intense and frequent ESL events, together with trends in coastal development will increase and expected annual flood damages by 2-3 orders of magnitude by 2100.



MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED

China

More than 32,000 square kilometres of China's coastal area – and more than 23 million people – are at risk, if sea levels rise by one meter. With a three-meter rise, these estimates would increase to more than 71,000 square kilometres and 52 million people. To reduce these risks, China is installing large-scale coastal defence infrastructure facilities and investing in technologies for flood forecasting and control. The nation has also been actively engaged with global climate deals by setting aggressive greenhouse gas reduction targets. China's strategy entails the incorporation of climate change concerns into its national development blueprints and encouraging sustainable actions to minimize the consequences of an increasing sea level.

Indonesia

In Indonesia, a one-meter rise would inundate more than 13,800 square kilometres and may displace 2.8 million people. The figures multiple to 35,090 square kilometres and 5.1 million people, if sea levels climb to three meters. The Indonesian government plans to reduce these risks by moving the capital from Jakarta to Nusantara, which is located on Borneo Island. Indonesia is keenly involved in the restoration of mangroves, thus providing natural barriers against coastal erosion and flooding.

Vietnam

Around Some 11 percent of Vietnam's population would face inundation risk if sea levels rose by one meter, and the ratio climbs to an alarming 26 percent if sea levels rise by three meters. Vietnam has been taking various measures to tackle the issue of sea level rise. The nation has prioritized investments in coastal infrastructure, more sophisticated flood forecasting systems, and the promotion of sustainable agricultural practices to build its resilience. With the Mekong Delta water resource management model, draining one fifth of all dry-season inundations and managing flooding with embankments to protect key sectors is considered necessary for maintaining ecosystem integrity and sustaining agricultural productivity in the region.

Philippines

The Philippines suffers regularly from very strong typhoons, which gain intensity due to sea-level rise, causing the nation to suffer seriously from flooding and land erosion in its low-lying areas and cities like Manila. The Philippines strengthens its disaster risk reduction frameworks with the use of early warning systems and emergency response plans. Needed armouring structures are constructed and maintained along its coastline, such as seawalls

[4] [NASA-Sea level change / Analysis of the global sea level "budget". Comparison of the combined GMSL time series from GRACE/GRACE-FO and Argo to the GMSL time series from satellite altimeters.] Accessed 30 July 2024.

and breakwaters. Besides, the Philippines has focused on projects for adaptation to enhance resilience in vulnerable communities and actively participates in international climate negotiations.

Japan

Japan is very exposed to sea level rise due to the length of its coastline and the frequency of various natural hazards, such as tsunamis and typhoons. Coastal flooding and erosion present significant threats to large urban centers like Tokyo, Osaka, and Yokohama. Japan had invested significantly in the development of coastal defense infrastructure, including seawalls, dikes, and breakwaters to protect itself against these threats. The country utilizes the latest technologies in tsunami forecasting and flood prediction, which enables it to enhance its preparedness against these climate-related disasters. Japan is at the forefront of climate research, having contributed immensely to knowledge about climate change through institutions such as the Japan Meteorological Agency. At the international level, Japan engages in various climate agreements, such as the Paris Agreement, which establishes Japan's commitment to global climate action.

Asian Development Bank (ADB)

Climate adaptation and mitigation is one of the key support areas for Asian Development Bank (ADB) operations in Asia-Pacific. ADB provides financial assistance to projects that assist in creating more disaster-resilient infrastructure and communities. The Initial Projects Key initiatives under the ADB's Climate Change Operational Framework include several ongoing projects in ASEAN countries all to do with strengthening climate and development resilience.

United Nations Environment Programme (UNEP)

The United Nations Environment Programme (UNEP) is also known as a prominent actor in the fight against the consequences of increased sea levels. UNEP implements global and regional environmental programmes of work for the improved understanding, prevention and control of bi-and multi-lateral pressures on their immediate surroundings that can help counteract sea-level rise. UNEP helps countries prepare to deal with the negative impacts of climate change-thereby supporting long-term environmental sustainability and resilience through its Global Adaptation Network and a number of several other regional projects across Asia-Pacific.

TIMELINE OF EVENTS

DATE	DESCRIPTION OF EVENT
1900-1920s	Initial observations and early measurements of global sea level rise begin.
1988, November 30	Intergovernmental Panel on Climate Change (IPCC) was established to assess climate change, including sea level rise change, including sea level rise.
2001, January 24	IPCC Third Assessment Report released, highlighting vulnerabilities in the Asia-Pacific region.
2004, December 26	Indian Ocean tsunami brings attention to coastal vulnerabilities and the need for early warning systems.
2009, 31 August – 4 September	Global Framework for Climate Services (GFCS) was established to improve climate information and services.
2014, August 28	Pacific Islands Forum issues a statement calling for urgent action on climate change and sea level rise.
2015, December 12	Paris Agreement adopted at the UN Climate Change Conference (COP21) to limit global temperature rise and support adaptation efforts.
2019, January 22	Asian Development Bank (ADB) launches major climate adaptation projects in Southeast Asia.
2023, May 15	Significant investments in adaptation infrastructure begin in countries such as Indonesia, Vietnam, and Fiji.

RELEVANT UN RESOLUTIONS, TREATIES AND EVENTS

General Assembly Resolution 72/217, Dec 2017[5]

Resolution 72/217 of the United Nations General Assembly was adopted in December 2017, this resolution acknowledged that climate change constitutes one of the greatest threats to international peace and security; concern was expressed at sea-level rise. The international community must also broaden the scope of its work to bolster these regions, and especially small island developing states as well as Asia-Pacific coastal States in their endeavours to withstand sea level increase.

General Assembly Resolution 76/212, Dec 2021[6]

The UN General Assembly's Resolution 76/212, adopted on December 17, 2021, addresses the threat of rising sea levels in the Asia-Pacific region. Titled "Protection of global climate for present and future generations of humankind," it underscores the urgent need for international cooperation to support vulnerable countries in adapting to climate change.

The resolution highlights the importance of achieving Sustainable Development Goals (SDGs), particularly Goal 13 (Climate Action) and Goal 14 (Life Below Water). It calls for the development and implementation of climate adaptation and mitigation strategies, financial and technical support for developing countries, and the promotion of climate resilience.

Key actions include strengthening early warning systems, investing in sustainable infrastructure, enhancing scientific research, promoting sustainable land use, and increasing community engagement in climate adaptation. Resolution 76/212 reflects the global commitment to addressing climate challenges in vulnerable regions like the Asia-Pacific.

The Sendai Framework for Disaster Risk Reduction

The Sendai Framework for DRR is a global pact adopted at the Third UN World Conference on Disaster Risk Reduction in March 2015 to reduce disaster risks globally. It calls attention to the growing risk of disaster, increasingly due to sea-level rises that require advancing in efforts to reduce vulnerabilities and strengthen capacities for adaptation in a globally hot region long recognized as one with high vulnerability.

The Annual Pacific Islands Forum

On the same page, the Annual Pacific Islands Forum Leaders' Meetings[7] (or only "The PIF") is comprised of annual meetings that consistently focus on climate change and sea level

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[5] "A/RES/72/217." Undocs.org, 2024, undocs.org/Home/Mobile?FinalSymbol=A%2FRES%2F72%2F217&Language=E&DviceType=Desktop&LangRequested=False. Accessed 27 July 2024.

[6] https://documents.un.org/doc/undoc/gen/n21/408/04/pdf/n2140804.pdf?token=vE5cHOzkjGoXi6r8kb&fe=true.

[7] *Founded in 1971, the Pacific Islands Forum (PIF) supports Pacific island nations in tackling climate change and rising sea levels. Its members include Australia, Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.*

rise. These meetings provide a platform for Pacific Island nations to advocate for stronger international action and support for climate resilience and adaptation efforts.

UN Climate Action Summit

Lastly, one more important event concerning rising sea levels is the UN Climate Action Summit in September 2019, which was held in New York with world leaders including leading climate activists and experts to expedite action on climate change. The summit shone a light on the reality of increased sea level rise especially in places like Asia-Pacific and brought into focus the range of responses required from countries and organizations.

PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

Technical Studies in Bangladesh

Regarding this, the South Asia region has recently conducted a number of technical studies in Bangladesh to understand the spatial and temporal variations in the impacts of the cyclonic storms, the role of mangroves along with embankments in protecting the coastal areas from storm surges, the impacts of progressive salinization on agriculture, and the impact on mangrove species, freshwater fish habitats, and livelihoods of coastal communities. These technical studies outlining the economics of adaptation measures are also providing inputs to several ongoing initiatives in coastal area management beyond Bangladesh.

The Association of Southeast Asian Nations' (ASEAN) efforts

ASEAN played a very huge part in the prevention of climate change. More significantly based on their last report, ASEAN in the following years will mainstream adaptation into sectoral and development planning, promote co-benefits of mitigation and adaptation, and develop regional, national, and local adaptation plans.

Commitments of the Pacific Island Forum

The PIF commitments respond to the dire climate challenges facing its member states, focusing on a unified approach toward resilience-building and sustainable development in a region vitally impacted by climate change. Anchored by its advocacy of global climate action, the PIF takes up the Blue Pacific Continent narrative, articulating a central role for the ocean in climate control. It founded the Pacific Resilience Partnership, which coordinates efforts between governments, civil society, and development partners. Finally, in further strengthening resilience, the PIF extends capacity building and technical support for enhanced national and community-level response to climate change.

POSSIBLE SOLUTIONS

Building Robust coastal defences

Addressing the disturbing impacts of the rising sea levels in the Asia-Pacific region requires, in fact, a multi-faceted approach wherein scientific, technological, policy, and community-based strategies are integrated. One important element of intervention is the building of solid coastal defences. That seeks to provide protection in areas that go exposure to rising levels of the sea. This may include building sea walls, levees, and flood barriers, uplifting, and enhancing the resilience of infrastructure.

Natural measures

The other remedial measure includes the construction of barriers using natural features. For instance, systems of mangroves, coral reefs, and wetlands would function to reduce coastal erosion, acting in the same way an elastic band will on a larger scale, absorbing wave energy. Along the same lines, the same systems will provide other services related to conserving biodiversity on the one hand or absorbing CO2 from the atmosphere. Similar methods can also be applied in city planning. This may be through smart zoning regulations that disallow building in areas significantly prone to disasters. Also, it may take place through the encouragement of parks and less-concrete coverage for stormwater, or it could be through early warning for flood and coastal events.

Sustainable Agricultural Practices

Further, as there are numerous expected changes that need to be undertaken in reaction along coastlines, there are also various sustainable agricultural practices that can be applied. Other important examples are; the use of salt-tolerant crop varieties, new irrigation techniques, and agroforestry to improve food security and livelihoods in areas facing salinity or extreme flooding. Also significant among adaptive measures is putting power into the hands of local people—the indigenous and the poor. This includes awareness raising on sea level rise, communing with communities on planning and implementation of adaptation measures and provisioning of tools for capacity building to stimulate local resilience.

Fund raising for adaptation programmes

Aijaz says, thus, the answer lies in finding the required capital for adaptation projects, and this can come through the innovative financing mechanism of climate bonds, insurance schemes, or leveraging on international climate funds to make sure that sustained financial resources are availed to large scale adaptation actions. Public-private partnerships can be facilitated to create more investment opportunities. Adaptation strategies are more effective through cooperation in the Asia-Pacific between countries. This may also relate to knowledge exchange, technology, and best practices transfer across nations, and Collaboration among international efforts to address the climate impact that is trans-boundary.

Science research

Interaction-based scientific research ought to be active and continuous to have a deep insight into the dynamics of sea level rise and efficient adaptation measures. A robust

monitoring system should be developed for observing the changes in sea levels, shoreline erosion, and the ecosystems. This can be achieved by developing resilient institutions that are able to respond to the crisis promptly, relevant policy frameworks that support the adaptation process at both the national and local levels, and capability building programs that will enable expert people to develop from the region itself in order to deal with the issues at the source.

Investment in Education

This means that, back in view of the rise in sea level, it is good for governments to invest in education to trigger a response in people and institutions. This will include mainstreaming issues of climate change in school curricula, training professionals on climate risk management, and supporting research organizations in developing innovative solutions to this among other issues. By broadly doing this, the Asia-Pacific region will be able to build the much-needed resilience against rising ocean waters, which at the same time protects vulnerable human settlements and ensures sustainable development towards climate change impacts.

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