Forum: Special Conference on Environment

Issue: Discussing the rising sea levels and the creation of Floating Cities in the context of sustainable urbanization

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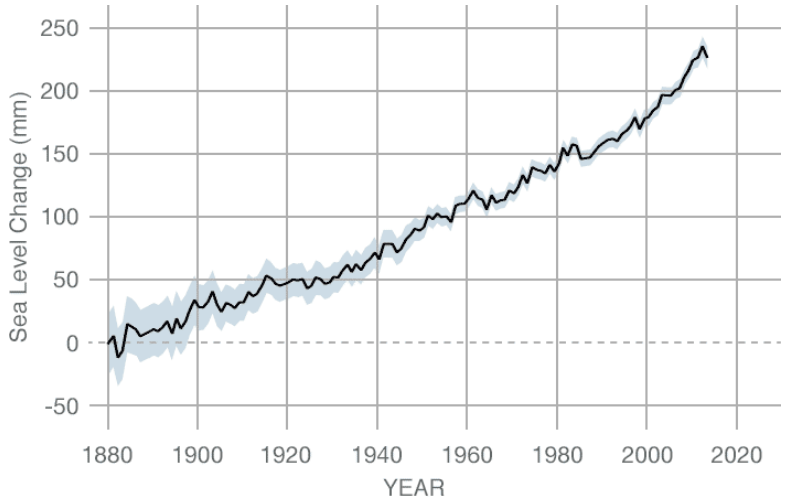
Introduction

Coastal areas have always been a hotspot for civilization. For thousands of years humans have used water for hundreds of different reasons for basic survival and development. That is why in the modern world, many big countries and nations are based near waters and coasts. With more and more developments happening to technology and more industrialization occurring, greenhouse gases are becoming more and more common in the atmosphere of the world. Sea levels have been rising constantly for the last few decades due to the increasing amount of greenhouse gases which expand the water, ultimately increasing the sea level.



As of now, there are over 1500 coastal zones affected by the rising sea levels throughout the whole globe. Sea levels have risen about 21-24 centimeters every

year since 1880, they also rise at specific locations. Local factors such as; erosion, regional ocean currents, upstream flood control and land height shifts are the reasons behind rising sea levels. “The research of the team shows that sea level rise from melting ice sheets is already responsible for half of the 7 centimeters of increase observed since 1993. At the current rate, the rise of the level of the oceans of about 3 millimeters per year right now could more than triple to reach 10 an extra millimeters per year by 2100.” (UNFCCC) With these statistics and data, it is clear that this problem has not been solved yet and there are still many steps needed to be taken. We will be going over the problem, why it has occurred and how we will be able to solve it in the near future.

Definition of Key Terms

Rising Sea Levels: A rise in sea levels is a sign of global warming and is caused by external factors such as extreme weather.

Coastal Protection: Ways of reducing or avoiding erosion and flooding along coastlines, such as tidal barriers and sea walls, as well as natural barriers like mangroves and wetlands.

Disaster Risk Reduction: Techniques for improving safety, mitigation and response in order to reduce the possibility and impact of catastrophic events, such as flooding brought on by rising sea levels.

Climate Refugees: A group of people who have been forced to leave their homes due to climate and environmental factors, who move to a place where the climate is more beneficial or hospitable.

Wetlands: An area of land that is usually saturated with water, often a marsh or swamp. (Oxford English Dictionary)

Mangroves: A tropical tree, found near water, whose twisted roots grow partly above ground. (Cambridge Dictionary)

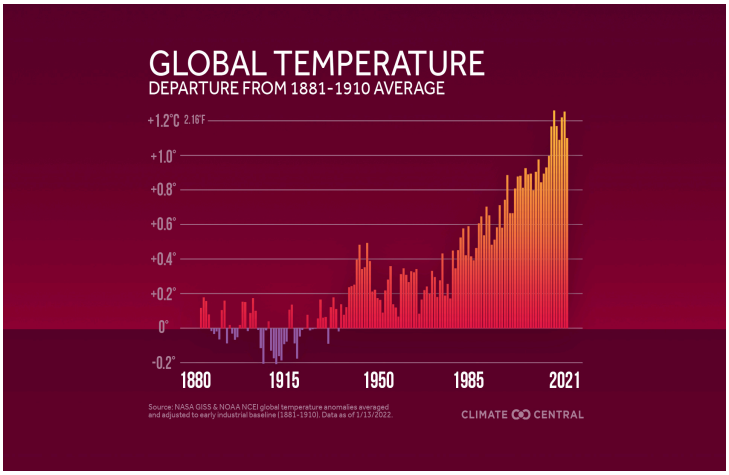
Glaciers: A large mass of ice that moves slowly (Cambridge Dictionary). It can be found near the North Pole or Antarctica.

Sustainable Coastal Ecosystems: Preserving and rebuilding coastal habitats, such as coral reefs, seagrass beds and mangroves, that act as organic barriers against sea level rise.

Background Information

The Reason Behind Rising Sea Levels

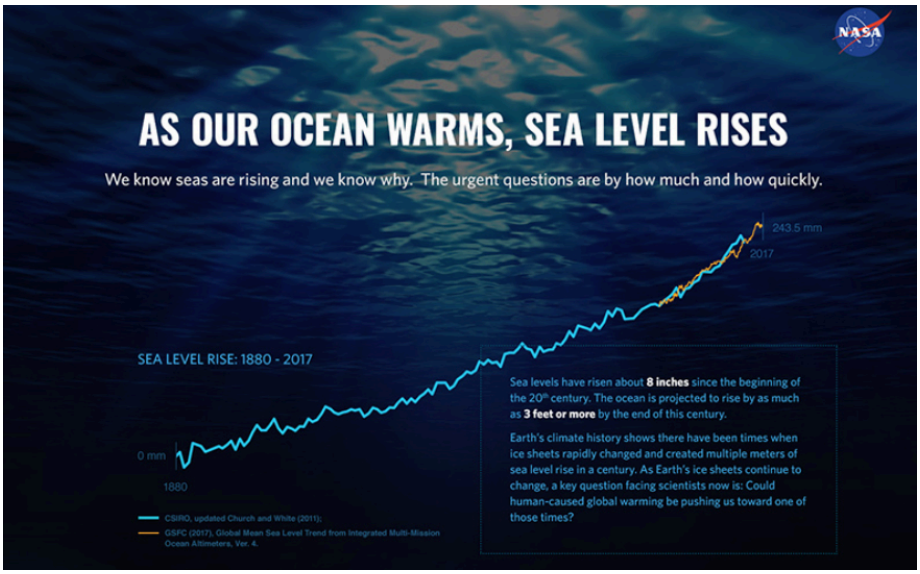
The primary reason behind rising sea levels in coastal areas is simply global warming. It is also driven into two factors being thermal expansion and melting ice glaciers which both add onto the ocean water. Due to seawater's thermal expansion in temperature as it heats, the meltwater from glaciers and ice sheets affect sea levels rising uncontrollably. Sea levels also rise due to local factors such as: erosion,hazards from storms, regional ocean currents, upstream flood control and whether the land is still recovering as a result of the Ice Age glaciers' comperasive weight. Additionally, major ice quantities in



Antarctica and Greenland are melting rapidly, which directly affects the sea level rise. Also, this effect becomes worse by the melting of smaller glaciers worldwide. Sea levels have risen by 21 to 24 centimeters over the past centuries due to both impacts of thermal expansion and ice melting, this rate is increasing and expected to rise in the following decades. In addition to these environmental factors, human behaviors like burning fossil fuels and deforestation makes the issue worse by raising the atmospheric concentrations of greenhouse gases, which affects global warming.

The Effect of Rising Sea Levels on Coastal Cities

Centuries ago, humans chose areas to settle that were closer to rivers and seas due to the plenitude of water sources, as a result many small cities and countries built near rivers or sea are highly affected by rising sea levels. Rising sea levels have significant and lasting effects on the environment, society, and economy in neighborhoods of coastal cities. With the rise of sea water, many cities are flooded and it makes vital activities difficult. It has been observed that flooding can drown neighborhoods, can damage properties, put local jobs in difficulty, displace millions of people and weaken the economic havoc. Low-lying coastal cities are more open



to flooding when sea levels rise, particularly during storms or high waves. Roads, bridges, power plants and sewage systems are examples of important assets that may be flooded as a result, severely impacting daily life. In addition to increasing the frequency and intensity of storm surges, rising sea levels also cause the damage that hurricanes, typhoons and tropical storms do, making these natural disasters even more serious for communities that are already at risk. People may be forced to relocate due to the loss of resources and land, creating "climate refugees" while also affecting neighboring communities as they take in the displaced and the ones who lost their homes or their cities. From an economic point of view, increasing sea levels put at risk sectors such as shipping, tourism and fishing that rely on coastal infrastructure, leading to job losses and finances that are unstable or change season to season. The situation becomes worse by the loss of ecosystems that are essential for biodiversity, coastal protection and the storage of carbon, such as the mangrove forests, coral reefs and wetlands along the coast. By the middle of the century, the estimated global economic costs to cities from inland floods and rising sea levels could reach 1 trillion dollars. Cities will experience sea level rise at different rates due to local circumstances, just like other climate dangers. Major cities in South Asia, such as Bangkok and Shanghai, as well as cities on the U.S. East Coast cities like New York City and Miami are especially at high risk.

The Paris Agreement

The Paris Agreement was made to acknowledge the challenges of climate change and global warming. Based on the most recent known evidence, The Paris Agreement's implementation calls for social and economic change. The Paris Agreement focuses on a five year cycle of countries stepping up or taking stronger climate action. Nationally determined contributions (NDCs), or national climate action plans, have been submitted by nations since 2020. A higher level of ambition is meant to be reflected in each following NDC than in the one before it. The COP27 protection choices requested Parties to review and strengthen the goals for 2030 in

their NDCs to be consistent with the Paris Agreement temperature goal by the end of 2023, taking into consideration different national circumstances, acknowledging that urgent action is needed to keep global warming to 1.5˚C. Countries created a stronger transparency framework (ETF) with the Paris Agreement. Beginning in 2024, nations have been required by the ETF to publish open and honest reports on their efforts to reduce climate change, adapt to it and provide or receive assistance. In addition, it establishes worldwide protocols for the evaluation of the reports that are submitted. “The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. It entered into force on 4 November 2016. Its overarching goal is to hold “the increase in the global average temperature to well below 2˚C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5˚C above pre-industrial levels.” (UNFCCC)

The Sendai Framework for Disaster Risk Reduction (2015-2030)

The Sendai Framework for Disaster Risk Reduction offers an effective plan for reducing the risk of disasters, which includes shielding coastal towns from the effects of climate change, such as rising sea levels. However, it places greater emphasis on catastrophe preparation than on infrastructure development and long-term adaptation.

Major Countries and Organizations Involved

Maldives:

As one of the world's lowest-lying nations, the Maldives is at the forefront of floating city development. In 2020, it partnered with Dutch firm Waterstudio to build the world’s first floating city. Rising sea levels threaten the nation’s very existence, prompting urgent adaptation efforts.

Netherlands:

With its long history in flood prevention and water management, the Netherlands is a leader in building international frameworks to shield coastal communities from increasing sea levels. The Netherlands has created innovative technologies and tactics to manage rising floods and coastal erosion because the nation has long been dealing with the difficulties of living below sea level. These involve the installation of complex dikes, levees and flood barriers as well as creative fixes like “room for the river” projects that allow water to be safely directed during floods. As a world leader in knowledge and expertise sharing, the Netherlands provides technical support and advisory services to other nations dealing with similar issues. The Netherlands has cooperated with worldwide organizations to improve climate resilience in coastal cities and has emerged as a center for water related innovation through projects like the Delta Works and Dutch Water Authorities. The nation is also involved in international climate negotiations, especially those held under the UNFCCC frameworks like the Paris Agreement, where it promotes more international collaboration on adaptation strategies, particularly for areas that are most vulnerable. To highlight its efforts in climate adaptation, the Netherlands held Adaptation Future 2016 in 2016. The city Dordt hosted the “Dordrecht flood management walking tour,” a city tour to explore what the city constructed to manage the water surrounding it over the course of a century, as one of the 13 locations chosen nationwide to welcome guests. To safeguard the homes of its residents, the city has constructed dikes by building ditches. In order to keep water out, authorities also installed stop logs on the streets and doorways. These are

routinely inspected to make sure they are functioning properly, particularly during floods.

Italy:

Given its wide coastline and the vulnerability of towns like Venice, Genoa and Naples to rising sea levels, Italy plays a vital role in establishing international frameworks to protect coastal cities. Italy has long struggled with coastal flooding, especially in Venice, which is at risk of sinking and rising floods. As a result, the nation has led the way in creating modern coastal protection solutions, like Venice's MOSE, which includes constructing barriers to shield the city from storm surges and increasing sea levels. Additionally, 2,6% of Italy is at high danger of flooding, based on a technical analysis from the Ministry of the Environment and Land Protection. Furthermore, it is typical for residential areas to be located in floodplains. Approximately 3.5 million people, or 6% of the Italian population, are believed to live in flood-prone areas. The Northern Italian Po River basin is the most fragile region. The region is home to 30% of the nation's population and 40% of all productive activities. The area has a high concentration of wealth and is especially vulnerable to increase in population. As a result, increased exposure raises the potential losses from flooding and emphasizes Italy's fragility to the major flood events predicted by forecasts.

United Nations Framework Convention on Climate Change (UNFCCC):

UNFCCC is a significant international treaty that tackles climate change, especially the problem of sea level rise brought on by global warming. The UNFCCC promotes international collaboration and action to battle climate change, the primary cause of sea level rise, even though it has no direct influence over it. A framework for international cooperation and the creation of agreements to cut greenhouse gas

emissions, which causes global warming and ice sheet melting, is offered by the UNFCCC. This includes important agreements such as The Paris Agreement, which establishes a goal to reduce the rate of increase in global temperature while also reducing some of the effects on sea levels. Additionally, it supports adaptation techniques by helping fragile nations, particularly tiny islands, manage coastal erosion and flooding. The UNFCCC also supports financial tools like the Green Climate Fund to assist developing nations in addressing these issues and controls the monitoring and reporting of climate consequences, including sea level rise.

United Nations Human Settlements Programme (UN-Habitat)

UN-Habitat promotes sustainable urban development and was a key backer of the Oceanix floating city project. It works with vulnerable countries to develop climate-resilient urban infrastructure.

Timeline of Events

Date	Description of event
3 March 1987	**The UN World Commission on Environment and Development publishes the "Brundtland Report," defining sustainable development and laying the groundwork for future climate and urbanization discussions.**
14 June 1992	**The Earth Summit (UNCED) opens in Rio de Janeiro, introducing Agenda 21 and emphasizing global**

	commitment to sustainable development, including urban resilience.
12 December 2015	**The Paris Agreement was adopted by 196 parties at COP21 in Paris, setting legally binding targets to limit global warming and indirectly address the issue of sea level rise.**
8 October 2018	**The IPCC releases its Special Report on Global Warming of 1.5°C, warning that small island nations and coastal cities will face existential risks due to accelerating sea level rise.**
3 April 2019	**The United Nations and Oceanix unveil the Oceanix City prototype at a roundtable in New York, proposing a sustainable, scalable floating city solution backed by UN-Habitat.**
22 September 2020	**The Maldives government announces a public-private partnership with Dutch firm Waterstudio to begin the construction of the world's first fully functioning floating city near Malé.**
14 November 2021	**At COP26 in Glasgow, discussions on climate adaptation include floating infrastructure as a viable long-term solution for countries threatened by sea level rise.**

13 March 2023	**Construction begins on the Maldives Floating City, designed to house over 20,000 residents in a lagoon near Malé, using modular floating platforms and sustainable technologies.**

Relevant UN Resolutions and Other Documents

UN General Assembly Resolution 44/206 – *Possible adverse effects of sea-level rise on islands and coastal areas, particularly low-lying coastal areas*

UN General Assembly Resolution 74/186 – *Sea-level rise in relation to international law*

UN General Assembly Resolution 78/108 – *Sea-level rise in relation to international law*

UNEP Governing Council Decision 16/27 – *Sea-level rise*

UNEP/EA.4/Res.11 – *Protection of the marine environment from land-based activities*
Sustainable Development Goal 11 – *Make cities and human settlements inclusive, safe, resilient, and sustainable*

Previous Attempts to Solve the Issue

Delta Works Project

Years ago, nations near the sea or located near rivers, tried several different solutions to protect their cities from flooding and the disasters that had come within. One of the examples of these solutions is the Delta Works project in the Netherlands. Delta Works project is a massive flood control project in the southwest of the Netherlands that created what amounts to multiple tide-free freshwater lakes by using dikes to block off the Rhine, Meuse and Schelde waterways that connect the islands of Walcheren, Noord-Beveland, Schouven, Goeree and Voorne. The idea, which was created by a Dutch engineer, gained a significant boost following the devastating flood of the North Sea on February 1, 1953, which destroyed 2,070 square kilometers of land in the southwest Netherlands and killed 1,836 lives. Soon after, work on the Delta Works project started and it was finished in 1986. The American Society of Civil Engineers has named the Delta Works one of the Seven Wonders of the Modern World.

Experimental Electromechanical Module

Venice, often known as the “city of water,” is sometimes called the “sinking city” or “flooding city.” It is unimaginable that a city as great as Venice should be floating in a lagoon of water, reeds, and marshland. The lagoon is made up of 118 islands in Northern Italy, at the head of the Adriatic Sea. In 2019, this city saw a catastrophic flood that flooded churches and restaurants, threw boats into the streets and left Venetians worried about a growing extreme future. In 2022, locals noticed a tidal wave that was almost as big as the one in 2019. Luckily there was no catastrophe in the city. After these horrible events, MOSE was introduced. MOSE stands for MOdulo Sperimentale Elettromeccanico (Experimental Electromechanical Module), this was seen as the solution to the problem. To prevent such catastrophic floods in the Italian city, the flood-barrier system, which is made up of rows of movable gates, attempts to cut off the lagoon from saltwater during acqua alta, or high tides. Originally created in 1984, the MOSE project consists of 78 retractable gates placed at the Lido, Malamocco and Chioggia harbour mouth

inlets to the Venetian Lagoon. The handling systems are situated on an artificial island that connects the three inlets. The barriers temporarily raise up to prevent the Adriatic Sea from flooding into the lagoon during periods of exceptionally high tide. It is intended to shield the city from up to three-meter tides. Fears of Venice becoming a contemporary Atlantis have decreased because of this historic climate change solution, which took 30 years to develop and 20 years to build. Even though these projects seem functional, the flooding and the aftermath of rising sea levels haven't stopped. Venice, The Netherlands and many more coastal areas are in great danger.

Possible Solutions

Even though there have been some solutions for the aftermath of rising sea levels, they are not very helpful due to modern day problems like global warming and instant climate change. Venice is still in danger and expected to sink in 100 years or Dutch engineers are still working on solutions to solve this problem. However, it is safe to say that strengthening frameworks like the Paris Agreement or the Sendai Framework Disaster Risk Reduction can help reduce the effects of sudden climate change. It is important that nations, particularly those most at risk from rising sea levels, work together more closely. Increasing funding for coastal protection initiatives through programs like the Global Environment Facility (GEF), Green Climate Fund or other international funding sources could improve global frameworks. This will enable developing countries to make investments in resilience strategies including early warning systems, ecosystem restoration, and flood protection infrastructure. For improved preparedness and risk management, early warning systems that can forecast flooding, storm surges and increasing sea levels must be expanded. Resilience planning, which combines coastal risk assessment and climate forecasting into urban construction, could also help coastal cities by making sure they are equipped to manage any threats. This

entails incorporating climate risks into regional plans and constructing infrastructure that can adjust to shifting sea levels.To protect coastal cities, measures at the local, national, and international levels should be coordinated. Stronger regulations for managing coastal zones, specific guidelines for land use in susceptible places, and making sure that growth doesn't increase the risk of flooding are all part of this. It is also crucial to strengthen enforcement of laws pertaining to coastal protection and the conservation of natural barriers like coral reefs and mangroves.

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