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Sylvia Early once emphasized, “No health to the ocean means no health for us.” With the oceans covering more than 70 percent of the Earth, they hold a mesmerizing array of life. However, a revelation uncovers the balance of preserving this vital habitat. The Life Below Water Sustainable Development Goal (SDG) focuses on solving problems like this. This goal tackles challenges such as, overfishing, marine pollution, habitat destruction, and acidification and strives to promote the sustainable management of climate change. Many climate and anthropogenic factors worsen these concerns, posing significant threats to the marine ecosystems, therefore comprehensive mitigation strategies must be implemented to ensure the long-term health of our oceans.

Pollution and climate change increases the rate of the warming of the oceans, which leads to ice caps melting and floods occurring, which will rise to a range of economic and social repercussions. One of the most significant impacts of melting ice caps is their effect on the economy. Storm surges will “impact the current infrastructure and the construction of new property on the coasts, which has the potential to lead to a decline in the local economy” (ODU Undergraduate Research). The quote underscores the repercussions of rising sea levels and storm surges on coastal infrastructure. As the oceans warm, these phenomena existing structures and can lead to their deterioration. Furthermore, the construction of new properties

in coastal areas becomes more challenging due to the need for additional protection measures against these environmental threats. Another area that will be severely affected by sea levels is agriculture and food security. According to NIBIO, Vietnam farmers “have been reporting increased salinity levels in their soil and irrigation waters.” Low-lying agricultural regions near coastlines will face the problem of being exposed to saltwater and soil erosion. These factors, which are intensified by climate change, will negatively impact crop yields, and threaten the economy livelihoods of farmers and communities who are heavily reliant on farming.

Consequently, there will be a rise in food prices, reduced agricultural productivity, and potential food shortages, leading to economic instability and social challenges. Turning our attention to humans, coastal communities will experience vulnerability to extreme weather events, such as tsunamis or storms. “New research suggests that 300 million homes will be affected by coastal flooding in the next 30 years” (CBS NEWS) The destruction of homes, and public services will make everyone’s life more challenging. The number of human casualties will escalate, and health would be a burden. These ecosystems provide critical breeding grounds for marine species, protect coastlines from erosion, and support local tourist economies (Coral Reef Alliance). Melting ice caps and rising sea levels have wide-ranging consequences, which can severely disrupt many factors consisting of both economy and health issues if not acted on quickly.

While the economic and human crisis are alarming, the marine ecosystem will also be targeted. Many coastal habitats, including mangroves and coral reefs, will be at risk of submergence. Increasing ocean temperatures, can also disrupt marine ecosystems and affects the

distribution, behavior, and reproductive patterns of marine species. According to EPA, “Increased acidity makes it more difficult for certain organisms, such as corals and shellfish, to build their skeletons and shells.” Since the increase in carbon dioxide levels will make the seawater more acidic, these effects could have a negative impact on marine ecosystems. Coral reefs are highly sensitive to changes in pH levels. Increased acidity can hinder their ability to build and maintain their skeletons made from calcium carbonate, leading to coral bleaching, and in some serious cases, the death of corals (NOAA). Moreover, shellfish rely on their shells to protect themselves and survive. The increased acidity in the ocean may hamper their ability to maintain these shells, making them extremely vulnerable to predators and environmental stressors. “A few years ago, the shellfish industry became alarmed that 80% of oyster larvae at hatcheries were not surviving” (Los Angeles Times). Disruptions in feeding and reproductive processes can have cascading effects throughout the marine food web. For instance, if a predator experiences reduced feeding success due to changes in prey availability, the population of it will decrease, and it may impact species further down into the food chain. Furthermore, coral reefs and planktons are the basic necessity for the food chain. These algae serve as a primary food source for corals and other reef organisms (Science Direct). Without all these important marine species, the food chain will be disrupted and will form a negative domino effect until it affects humans. Over time, as this situation persists, the availability of food for humans will dwindle, resulting in a scarcity that can lead to widespread hunger, poverty, and deprivation. Another example is “Increasing Ocean temperatures can disrupt marine ecosystems and alter the distribution and behavior of marine species, leading to changes composition and abundance” (NOAA Fisheries) This indicates that some species are

forced to move towards to areas with cooler water temperatures which can cause imbalances in the ecosystem. It can also be a harmful effect on feeding and reproduction patterns. If rising ocean temperatures lead to changes in the distribution or abundance of key prey species, then the predators relying on that prey may experience might encounter food scarcity and struggle to find other animals it can feed on. This can result in reduced growth rates, or even the extinction of an entire population. The economic implications of rising sea levels and ocean acidification demand immediate action to protect coastal infrastructure and sustain economies reliant on marine resources.

Building upon the ecological disturbances caused by climate change, it is also crucial to recognize that unsustainable human practices, including overfishing and unregulated tourism, pose significant threats to marine life by disrupting ecosystems and compromising the health of coastal and marine habitats. As stated by Marine Stewardship Council, the overfished stocks have increased three times its rate since 1970. The impacts of overfishing have been increasingly obvious which “cultivated the devastating collapse of Canada’s Grand Banks Cod Fishery in 1992” (Marine Stewardship Council) this made many people lose their jobs and the unemployment rate increased. This will have cascading effects on relate industries, leading to further unemployment in areas dependent on a thriving fishing economy. A bankrupt economy isn’t the only problem caused by overfishing, the animal population below water will also take a shift in dynamic. “With an estimated 85% of global fish stocks that are stressed, in decline, or have already collapsed” (Green tumble) highlights the alarming state of global fish populations. This statistic emphasizes the severity of overfishing problem and the urgent need for

sustainable fishing practices. This high percentage stresses the number of declining fish stocks which indicates that a vast majority of fisheries are being exploited beyond their sustainable limits. It also puts pressure on marine ecosystems and threatens the long-term viability of fish populations. When many importance species decline, it can affect their predator's reliance on them which can diminish reproductive success and lead to the extinction of fish populations. Moreover, unsustainable tourism practices, such as overcrowding, pollution, habitat destruction, can also harm marine ecosystems and decrease the amount of tourist attractions over time. In many areas, "mangrove forests and seagrass meadows have been removed to create open beaches, tourist developments such as piers and other structures have been built directly on top of coral reefs," (Marine Species). This can disrupt the ecological balance and have cascading effects on the interconnected relationships within the ecosystem. Mangroves provide shelter, nursery areas, and feeding grounds for numerous marine organisms, and there will be a lot of consequences in their loss. Additionally, it can reduce their capacity to store carbon dioxide, diminishing their role in mitigating climate change. Similarly, "some tourist resorts empty their sewage and other wastes directly to water surrounding" (marinespecies.org), which effects habitat destruction, as well as water pollution. Health risks to sea animals will increase drastically if this continues to occur. Protecting the marine ecosystem can help prevent all the harmful impacts and support local economies while saving Earth's biodiversity.

The Life Below Water SDG is a crucial call to action, emphasizing the significance of our oceans and the immediate need for intervention. Overfishing disrupts the food chain, leading to the

extinction of fish populations and far-reaching consequences. Rising sea levels and ocean acidification show great threats to coastal regions, endangering both marine ecosystem and human casualties. Habitat destruction exacerbates the vulnerability of marine life. To address these pressing challenges, it is essential to prioritize sustainable fishing practices, establish and protect marine reserves, reduce greenhouse gas emissions, and promote responsible waste management. By taking collective action, we can ensure a sustainable future for generations to come.

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