

CHAPTER I

INTRODUCTION

1.1 Background

Coral reefs are a home to more than 25 percent of all marine life, while simultaneously taking merely one percent of the ocean floor,¹ making it an ecosystem that supports the highest concentration of marine biodiversity.² They are the foundation of a marine ecosystem so complex yet so beautiful that it would be impossible to recreate with even the most advanced technology and the most brilliant minds of mankind. Their bright colours and intricate design leaves people in awe for their aesthetic value, yet many do not realize that their existence means so much more to us.

In fact, corals are of extremely high value; a new study has found that losing just the top three feet of those reefs could lead to \$4 billion a year in flood-related damages, such as those as a result of storm surges that are unable to be dissipated without the protection of coral reefs. This is seen through the devastating impacts of storms in the following years, hitting Puerto Rico, Houston, and the Philippines particularly hard.³ This excludes the economic value it creates for fisheries, tourism,

¹“Coral Reefs.” 2019. *WWF*. Accessed February 25.
http://wwf.panda.org/our_work/oceans/coasts/coral_reefs/.

²Polidoro, Beth, and Kent Carpenter. "Dynamics of Coral Reef Recovery." *Science* 340, no. 6128 (2013): 34-35.

³Berger, Matthew O. 2018. “Coral Reef Loss Could Cost Countries Billions.” *Pacific Standard*. Pacific Standard. June 22. <https://psmag.com/environment/the-financial-cost-of-losing-a-reef>.

and wave protection. Without these structures, not only would we be facing a drastic financial loss, but we would also be in threat of multiple ocean-based natural disasters that might send humanity off to our next mass extinction.

It is no doubt that it would be a dark, grey world without the existence of corals in our ecosystem. An article from the New York Times says that:

“What we will be left with is an algal-dominated hard ocean bottom, as the remains of the limestone reefs slowly break up, with lots of microbial life soaking up the sun’s energy by photosynthesis, few fish but lots of jellyfish grazing on the microbes. It will be slimy and look a lot like the ecosystems of the Precambrian era, which ended more than 500 million years ago and well before fish evolved.”⁴

The article encourages us to open our eyes and realize the true detrimental effects of the absence of coral reefs. Currently, there are a few international organizations that advocate for ecological sustainability, and efforts have been made to maintain marine diversity, which relies heavily on the protection of coral nurseries. In the past, agreements like the Kyoto Protocol and the Paris Agreement have been signed with aims to sustain the environment and slow down climate change, a factor that the increase of coral bleaching is directly proportional to. Now, with the existence of the United Nation (UN)’s aims to conserve life under water under number 14 of their Sustainable Development Goals (SGDs), more light has been shed on the matter and awareness continues to spread.

⁴Bradbury, Roger. 2012. “A World Without Coral Reefs.” *The New York Times*. The New York Times. July 13. <https://www.nytimes.com/2012/07/14/opinion/a-world-without-coral-reefs.html>.

Despite this, a large majority of people are either still unaware of the matter, or completely ignorant. Humans often overlook how much our actions contribute to the endangerment of these species, and do not realize that one third of the world's 845 species of reef building coral are considered to be at an elevated risk of extinction as a result of the combined effects of global climate change and local anthropogenic impacts.⁵

Coral reefs are already dying, and at a fast rate too. The Great Barrier Reef, the biggest single structure made by living organisms in the world,⁶ is suffering from a massive coral bleaching situation, with Thirty percent of the coral perished in 2016, another 20 percent in 2017.⁷ This causes the fish that reside there to migrate elsewhere to seek shelter and protection, often dying in the process due to the inability to adapt to the conditions of the deep sea and its vulnerability to predators. The more coral reefs die out, the further these fish will have to swim to find another home.

The main reason for a corals' death is due to coral bleaching. This is when a species of microalgae called zooxanthellae escapes the polyps that reside within the coral structure. Zooxanthellae are photosynthetic, meaning they provide nutrients for

⁵Polidoro, Beth, and Kent Carpenter. "Dynamics of Coral Reef Recovery." *Science* 340, no. 6128 (2013): 34-35.

⁶"Great Barrier Reef: No Buried Treasure." 2019. *Razor Tie Artery Foundation Announce New Joint Venture Recordings | Razor & Tie*. Rovi Corporation. Accessed February 23. https://web.archive.org/web/20071001045912/http://www.ga.gov.au/media/releases/2002/1013133456_20385.jsp.

⁷James, Lauren E. 2018. "Half of the Great Barrier Reef Is Dead." *National Geographic*. National Geographic. August 7. <https://www.nationalgeographic.com/magazine/2018/08/explore-atlas-great-barrier-reef-coral-bleaching-map-climate-change/>.

the coral and thus form a highly dependent symbiotic relationship.⁸ Without the greenish hue of the zooxanthellae, corals turn white after the microalgae escapes, thus the term coral ‘bleaching’. These corals are unable to produce food for themselves and will eventually die of starvation. The polyps would die out, fish will have to move away, and biodiversity will continue to drop drastically as it has been since human intervention.

However marine life is not the only actor at stake. Humans have it just as bad. Countries in Southeast Asia such as Indonesia, Thailand, and Philippines as well as coastal communities in western Mexico and parts of Australia, Japan, and Saudi Arabia will be the most damaged, scientists found.⁹ We can estimate from the value of coral reefs the intensity of the economic disaster, which would most definitely lead to an increase in unemployment rates.

Furthermore, coral reefs serve as protection for the estimated 62 million people who live less than 33 feet above sea level and less than two miles from a coral reef.¹⁰ If there is no undersea wall protecting them, both their property and lives are at a huge risk.

⁸Polidoro, Beth, and Kent Carpenter. "Dynamics of Coral Reef Recovery." *Science* 340, no. 6128 (2013): 34-35.

⁹Dennis, Brady. 2016. "Why the Death of Coral Reefs Could Be Devastating for Millions of Humans." *The Washington Post*. WP Company. November 9. https://www.washingtonpost.com/news/energy-environment/wp/2016/11/09/why-the-death-of-coral-reefs-could-be-devastating-for-millions-of-humans/?utm_term=.fee98559bc91.

¹⁰*Ibid.*

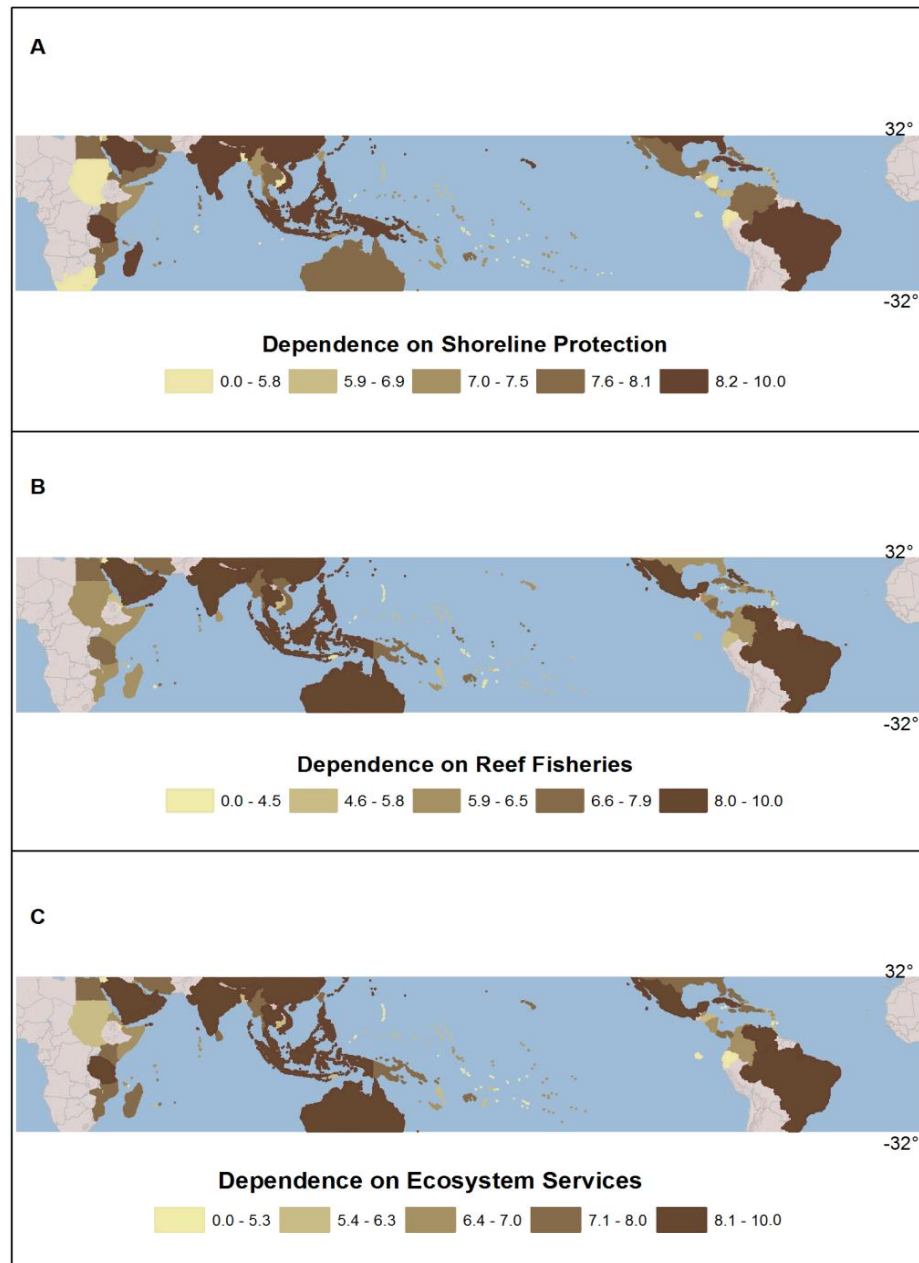


Figure 1: Scores of human dependences on coral reef ecosystem services, by country.¹¹

¹¹Pendleton, Linwood, Adrien Comte, Chris Langdon, Julia A. Ekstrom, Sarah R. Cooley, Lisa Suatoni, Michael W. Beck, et al. 2016. "Coral Reefs and People in a High-CO2 World: Where Can Science Make a Difference to People?" *Plos One* 11 (11). doi:10.1371/journal.pone.0164699.

A research article studied the human dependency of coral reef areas at a state level, by measuring shoreline protection and coral reef fisheries.¹² The study shows how most of the countries surrounding the ocean is highly dependent on these factors that were taken into consideration, with Indonesia scoring the highest level of dependence on both shoreline protection and reef fisheries, as well as the total dependence on ecosystem services.

It becomes clear that the coral reefs are in dire need of protection, especially with climate change being this close to becoming irreversible. With communities and international organizations raising their hands to fight for this cause, this research serves as a call to action, to further educate the public to understand the global impacts and causes of coral bleaching and find alternate ways to contribute towards solving the issue that has yet to successfully be done by the current environmental regime.

1.2 Research Question

Considering all the issues mentioned above, we start to wonder if there is any collective action that can be taken to solve the issue. Thus, this research attempts to answer the following questions:

How does globalization contribute to coral bleaching? And how does the environmental regime solve this?

¹²*Ibid.*

1.3 Research Objective

The objective of this research is to identify the major causes of coral bleaching, focused specifically on an international level. It aims to discuss the ways in which we can solve this issue, analyzing them and seeing which solution is the most plausible to take effect.

1.4 Research Contribution

The results of this research would provide insight on how countries can put aside their differences to solve one major global issue that is affecting everyone. Perhaps, it may even encourage people to believe that not all hope is lost at times like these. The aim is to increase awareness for environmental sustainability, and to remind people of the issues that is often look passed today, to remind everyone about the reality of climate change and how it is here, and it is affecting everyone. It is anticipated that this thesis will be of great importance not only in the subject of international relations, but also to everyone who are concerned about the well-being of our Earth.

1.5 Structure of Writing

The first chapter, Introduction, provides an overview of the thesis, and gives a brief background on the topic, talking about the nature of coral bleaching and states the research question which this thesis aims to address.

The second chapter, Theoretical Framework, discusses the international relations theory used in the thesis as well as certain theories and concepts that is key in understanding this research. This chapter summarizes scholarly articles and books about coral bleaching and globalization that I have used as a basis of which this research is written.

The third chapter, Methodology, shows the method to which this research is made, stating that we will be using qualitative research in gathering data and comparing statistical evidence on globalization and the rate of coral bleaching.

The fourth chapter is the Discussion. Here, the thesis analyses how globalization impacts coral bleaching both good and bad and provides information on how corals are beneficial to humans and our society. It highlights the previous attempts in protecting the environment, and why they have not been as successful as we hoped it would be.

Chapter five, Conclusion, sums up our research and summarizes the information we have gathered in the previous chapters. It also lists out the recommendations of how to be more efficient and effective in conducting climate action to protect the environment and prevent another mass global coral bleaching event to happen.