



Role of Oceans in Fighting Climate Change

Oceans and Climate Change

[The last blog](#) covered the basics of climate change. We learned that the climate is changing at an increasing rate with the increase in greenhouse gas emissions. As a result, the current average surface temperature of our planet is 0.8° Celsius warmer than the pre-industrial era, which is causing problems like shrinking glaciers. Although this is alarming, the average surface temperature could have been worse without the important role that our oceans play. Oceans absorb greenhouse gases like Carbon Dioxide (CO_2) with a remarkable efficiency. Out of all the CO_2 released by humans over the last two centuries, oceans have adsorbed an estimated 38% of it. However, even the oceans are struggling to keep up with the human emitted CO_2 . Most of the energy trapped by the greenhouse gases, i.e., heat, is absorbed by the oceans, which is depleting their ability to absorb CO_2 . Oceans are also becoming more acidic due to excessive amount of CO_2 dissolving in the water. As a result, in the past two centuries our oceans have become 30% more acidic.

Impact of Climate Change on Coral Reefs

Ocean acidification and ocean warming are causing problems like coral reef bleaching, slower growth rates of coral, and decline in their reproductivity. Although they look like plants, coral reefs are actually colonies of marine invertebrates that secrete calcium carbonate skeletal structures, which forms the “coral” that we see (see *Figure 1*). They provide habitat and food to aquatic animals, including 25% of all ocean fish species. It takes years for coral reefs to develop and flourish, and they have a remarkable ability to recover from damage. However, they are bleaching at such a fast pace now-a-days that they are unable to recover as quickly (see *Figure 2*). As a result, coral reefs all over the world are shrinking in size. The world’s

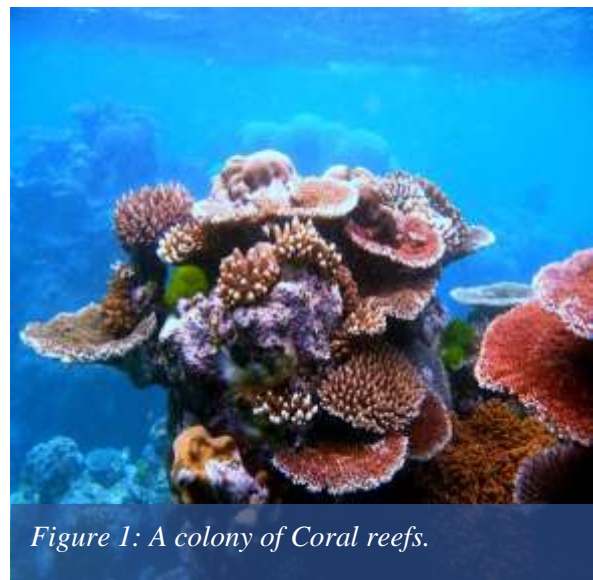


Figure 1: A colony of Coral reefs.

largest coral system, the Great Barrier Reef, has declined by over 50% between 1986 and 2012 due to a variety of reasons, including typhoons, which are getting more severe due to the climate change, and bleaching. If the CO₂ emissions continue to rise, 90% of all the world's corals will experience bleaching by 2055. Besides the destruction of marine ecosystems, loss of corals around the world will also result in an economic disaster caused by the collapse of fisheries. Healthy coral reefs are the breeding ground for many species of marine fish and hope to the small fish (fingerlings) before they are mature. The livelihood of millions of people, who live on the coasts and rely on the fisheries, will be affected.



Figure 2: A healthy coral on the left, while a degraded and algae dominated coral on the right.

Tip: What Can We Do to Help the Oceans and Corals?

We need to reduce our production of greenhouse gases, particularly CO₂. Food industry has one of highest greenhouse gas emissions among all other sectors. Meat production, for example, requires intense use of fossil fuels to cultivate the land, and to produce and apply chemicals (fertilizers/pesticides), and in some locations to irrigate with water, for the production of animal feeds. This produces high amounts of CO₂. Therefore, eating meat, especially beef, contributes significantly toward climate change. Eating one kilogram of beef produces the equivalent carbon emissions of driving a Honda Civic for 176 km. While in comparison, eating one kilogram of lentils only causes emissions equivalent of driving it 6 km. Therefore, by eating lower in the food chain, i.e., more plant-based diet, you can reduce your carbon emissions, help stop the climate change, and save our oceans and corals.

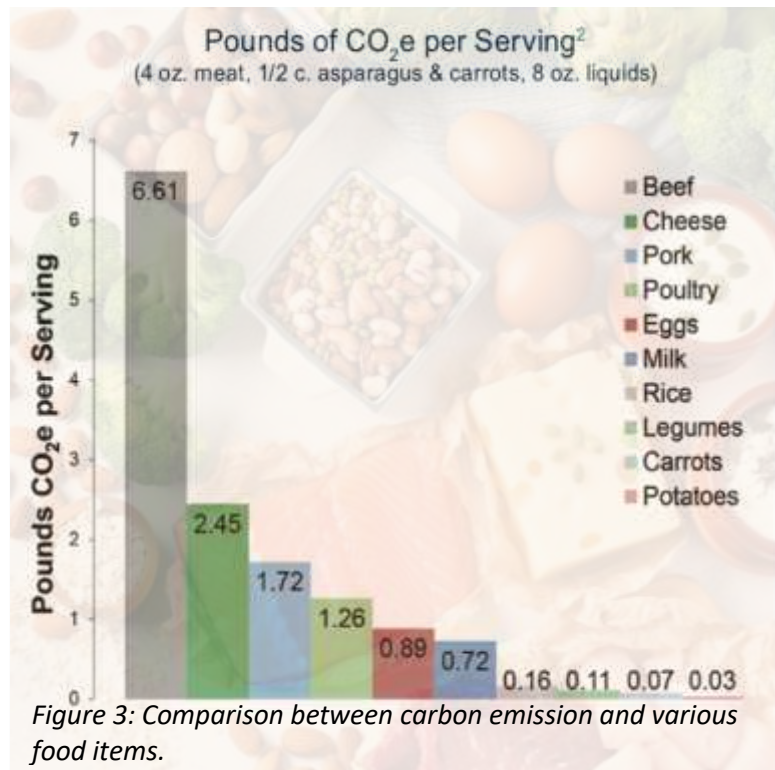


Figure 3: Comparison between carbon emission and various food items.

Next installment: We will learn about the role of forests in fighting climate change.

Picture credit:

<https://oceanservice.noaa.gov/ocean/corals/>

<https://blog.nationalgeographic.org/2015/07/22/offsetting-biodiversity-greening-or-greenwashing/>

<https://news.stanford.edu/2018/03/01/reefs-become-deserts-keeping-coral-healthy-hawaii/>

<https://www.hsph.harvard.edu/nutritionsource/what-should-you-eat/protein/>

<http://css.umich.edu/factsheets/carbon-footprint-factsheet>

<https://www.cbc.ca/news/technology/food-climate-change-carbon-footprint-1.4930062>

Additional Readings:

<https://ocean.si.edu/ecosystems/coral-reefs/great-barrier-reef-going-going-gone>

<https://www.sciencedirect.com/science/article/pii/B9781856176361000122?via%3DiHub>

<https://www.unenvironment.org/news-and-stories/story/greenhouse-gases-are-depriving-our-oceans-oxygen>

<https://www.climate.gov/news-features/featured-images/no-safe-haven-coral-combined-impacts-warming-and-ocean-acidification>

https://www.washingtonpost.com/news/energy-environment/wp/2016/11/09/why-the-death-of-coral-reefs-could-be-devastating-for-millions-of-humans/?noredirect=on&utm_term=.653d0f43d2e1

<https://www.noaa.gov/education/resource-collections/marine-life-education-resources/coral-reef-ecosystems>

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<https://earthobservatory.nasa.gov/world-of-change/DecadalTemp>