

Extreme Weather

In the past segment, we considered one of the consequences of the fact that the earth is warming because of human action: sea level rise - which many people once thought was the only consequence of global warming. They were mistaken.

In this segment, we will be taking up a range of additional - and worrisome - consequences, beginning with extreme weather events, like hurricanes and typhoons. Although having occurred throughout the centuries, these events are now becoming the norm and even more severe in the 21st century.

So, how does a warming earth contribute to hurricanes and typhoons?

Around 93% of the heat from climate change has been absorbed by the oceans. Burning fossil fuels and releasing gases like CO₂ and methane did not *directly* cause the oceans to increase in temperature. Instead, as noted in the previous section, releasing these gases caused the atmosphere to warm. Because the atmosphere is in direct contact with the oceans across 71% of the earth's surface, they served as heat sinks to absorb a good deal of this atmospheric temperature rise.

While in certain respects this has been great for us land-dwelling animals, as it has kept the atmosphere from dramatically heating, in other ways it has not been good. Not only, as we shall see in the next segment, did this create problems for sea life, it also means that the oceans can return this heat back into the atmosphere - with violent results.

As you may know, tropical cyclones (called "hurricanes" when over the Atlantic Ocean, "typhoons" over the Pacific, and "cyclones" over the Indian Ocean) form "[w]hen convection causes warm, moist air above the ocean to rise. They begin as a group of storms when the water gets as hot as 80 °F (27 °C) or hotter. The Coriolis effect made by the Earth's rotation causes the winds to rotate. Warm air rises quickly."

Simply put, the warmer the ocean, the more severe the cyclone.

As you may know, the scale that we used to assess hurricanes (the Saffir-Simpson Hurricane Wind Scale) ranks hurricanes from category 1-5, with 5 being the most severe, having average wind speeds of at least 157 mph. Hurricane Dorian, which devastated the Bahamas in 2019, had sustained winds of 185 mph and gusts up to 220 mph. These are wind speeds normally only associated with the most powerful tornados. Consequently, some climatologists are calling Dorian the first category 6 hurricane of the 21st-century. Dorian was, in fact, on par with the strongest hurricane ever to make landfall in the Atlantic in recorded history.

As we saw in the last segment, one of the major issues here is storm and tidal surge. Hurricane Dorian had a tidal surge of 23 ft. Dorian was particularly deadly because of this incredible wall of water coming in from the ocean. In the Bahamas alone, at least 70 people were killed.

Although it may sound somewhat paradoxically, weather events over oceans can also cause droughts over land.

Hurricanes and other cyclones are low pressure systems. In contrast, there are rotating high pressure systems known as anticyclones, which can last for extended periods of time. This happened from 2011 to 2019 when California had a sustained drought lasting over seven years. For years, a massive anticyclone parked over the Pacific (often called the “Ridiculously Resilient Ridge”) caused atmospheric moisture that would have normally reached the western coast of the continental United States to be diverted far north to places like Alaska.

As Stanford scientists note, “[t]he extreme atmospheric conditions associated with California’s crippling drought are far more likely to occur under today’s global warming conditions than in the climate that existed before humans emitted large amounts of greenhouse gases.”

Such droughts can obviously be massively disruptive to ecosystems, as well as the economy. Between 2014-16, the California drought took a \$3.8-billion toll on the state’s agriculture.

Droughts can also be socially disruptive. A drought in the Middle East exacerbated by the climate crisis helped bring about the Arab Spring starting in 2011. As Syria was particularly hard-hit, more than a million Syrians migrated from their rural homes to cities like Damascus. This helped fuel social tension that led to war. Consequently, 6.7 million Syrians left the country. As a million of these Syrian refugees sought asylum in the European Union, this, in turn, helped bring about the anti-immigration, populist movement that is currently gripping Europe.

As climate change helped exacerbate this situation, some of these people can be seen as “climate migrants.” Worldwide, there could be as many as one billion (that’s billion, with a “B”) climate migrants by 2050.

Not just draughts, but heatwaves have had a major impact in the 21st century. The ten hottest years on record occurred during the 21st-century. 2019 was second only to 2016 as the hottest of all years. Global warming has definitely arrived - in a big way.

Different parts of the globe heat differently. Consequently, in 2013, which ranks as the eighth hottest year on record, Europe was especially hard hit, with as many as 70,000 people dying of the heat. As David Wallace Wells notes, when conditions are right and it gets hot enough, “a human body would be cooked to death from both inside and out.”

Warm weather and draught can also set the stage for extraordinary wildfires. The 2019–20 Australian wildfires burned a mind boggling 46 million acres. Of the 20 largest wildfires in California history, 18 happened in the 21st century, 12 of which happened since 2017.

Unlike sea-level rise, many of the above events happen quickly, very quickly. Hurricanes, thunderstorms, and wildfires can sweep through an area in hours. Deadly temperatures can also peak in a matter of hours. Hence, if we were comforted by the fact that climate change seems to be happening at a glacial rate, so to speak, we really need to reevaluate the nature of this change.

Back in 2011, a literary scholar, Rob Nixon, published a book entitled *Slow Violence and the Environmentalism of the Poor*. In it, Nixon argued that “[t]he violence wrought by climate change, toxic drift, deforestation, [and] oil spills...takes place gradually and often invisibly...[and hence]...exacerbates the vulnerability of ecosystems and of people who are poor, disempowered, and often involuntarily displaced.”

At the time, a decade ago, this thesis made sense. After all, if global sea level were to rise a meter in the 21st-century, this amounts to just a fraction of an inch per year. If you are in a country too poor to prepare for the slowly rising sea, then you will feel the impact of the problem throughout the decades of the 21st-century. In some cases, such as the Republic of Maldives, where the average elevation is 1.5 meters, this will mean that this island nation will slowly disappear in the 21st-century.

Hence, as Nixon noted, there is a very slow violence, primarily impacting the poor.

Who is doing this violence to the poor? The wealthy nations (such as the United States) that are releasing the lion’s share of global greenhouse gas emissions.

Why is this primarily impacting poor individuals and countries? By the year 2050, a third of Manhattan will be subject to storm surges caused by climate change. However, Manhattan is located in a very wealthy country, the United States, and in fact is comprised of some of the most valuable real estate in the U.S. per square foot.

Consequently, the mayor of New York recently announced a plan to protect Manhattan from sea level rise that would cost \$10 billion. In contrast, the entire annual GDP of the Maldives is less than half that amount.

The profound irony here is that the countries that amassed enormous wealth by way of their fossil fuel economies, and in the process brought about the majority of our global climate crisis, will be partly protected from it by way of the wealth that they have amassed.

At least that was the prevailing wisdom advanced by Nixon and others. And again, it made sense a decade ago in 2011, when the general public thought that sea level rise was the principal consequence of anthropogenic climate change.

We now, however, know that the impact of climate change not only *will* be, but already *is* very different.

An example would be the recent wildfires in California.

First, California is not poor. In fact, if it were a country, California's economy would be fifth on the planet, surpassed only by the U.S., China, Japan, and Germany.

Second, the violence that we are seeing is anything but slow. For example, the wildfire that destroyed the town of Paradise, California swept through and destroyed the town in about four hours, killing more people than any wildfire in California history.

Hence, the climate crisis will not only bring slow violence to the poor, but also fast violence to the wealthy.

Whether it comes fast, slow, or somewhere in between and whether you are poor, wealthy or somewhere in between, the climate crisis will impact you, though it will impact different people in different places in a range of different ways.

It will also impact plants and animals across the earth, which will be taken up in the next segment.