

Environmental Injustice in a Warming Arctic

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Introduction

Background information

Climate change is naturally occurring; however, the current dialogue of climate change refers to anthropogenic climate change. The Anthropocene is the current geological age wherein human activity has the most significant impact on the environment and climate. According to the IPCC, “climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity” (Intergovernmental Panel on Climate Change). Much anthropogenic human activity revolves around using fossil fuels and emitting carbon, which consequently contributes to and accelerates climate change. Consequences of climate change are connected globally, such as more frequent and severe occurrences of natural disasters. Examples of such natural disasters include droughts in East Africa, floods in South Asia, hurricanes in the East Coast of the US, and wildfires in the West Coast of the US. Although climate change occurs globally, the impacts and scale differ by region. There are multiple lines of evidence proving that climate change is happening and not slowing down. It is imperative to evaluate the impacts of climate change in different regions.

Motivations

The inspiration for this paper came mainly from my experiences in Greenland and Copenhagen. Seeing the physical changes and having conversations with people who are directly impacted was a unique learning experience. These first-hand experiences built upon concepts and ideas I’ve been learning about through courses at UW. Additionally, the experience solidified a sense of urgency in not only combating climate change, but also in broadening the discussion of climate change. Two major themes that I constantly found myself reflecting on

were the concepts of environmental justice and environmental inequality. Both concepts surround the ideas of how certain communities bear the burden of climate change, especially when they have little contribution to it. Environmental justice and environmental inequality are important factors to consider when discussing climate change. There are many climate change consequences that are not seen by those who contribute most to it, and it is important to shed light on these.

Climate change has significant global impacts on water that is detrimental to both the environment and humans. The UN states “water is the primary medium through which we will feel the effects of climate change” (United Nations, n.d.). Those who are vulnerable to climate change also tend to face the direct consequences and issues surrounding water in regards to climate change. From my experiences in Greenland, this message was iterated multiple times. In Greenland, climate change leads to increases in glacier and surface melting. This creates barriers for people in Greenland where many consequences trickle-down and impact other elements such as livelihood and culture. In addition, increases in surface melt leads to sea level rise which will have vast impacts on many aspects such as human health and economies.

Climate change has huge consequences that act as a system globally. Warming in the Arctic is such an important aspect because the consequences can be disastrous for the rest of the world; warming in the Arctic may trigger natural disasters in other areas of the world. Many regions that would be affected also tend to be the ones that contribute the least to climate change. Therefore, there is environmental justice on a global scale; those who contribute the least tend to be impacted the most.

A Warming Arctic

Changes in the Arctic

The Arctic experiences climate change differently from other regions and faces relatively more disastrous consequences as the impacts are more concentrated. The Arctic “is warming twice as fast as the rest of the planet” (CNN, 2017). Warming in the Arctic will lead to melting glaciers, or surface melt, and this creates many issues that impact people not only in Greenland but around the world. More than 80% of Greenland is covered by an ice sheet, which would lead to a large amount of meltwater (CNN, 2017). As the “surface melt on Greenland’s ice sheet has been accelerating”, it is important to address the significance of surface melt to reduce the impacts globally (CNN, 2017).

In June 2018, an iceberg the size of lower Manhattan broke off Helheim Glacier in East Greenland (NYU Abu Dhabi, 2018). This calving event was captured using a time-lapse by researchers from NYU NY and Abu Dhabi. The time-lapse, which now has almost two million views on YouTube since it was uploaded four months ago, is a piece of shareable media that powerfully illustrated the impacts of warming. Another piece of shareable media is a video clip of a calving event in Ilulissat, where an iceberg also the size of Manhattan fell off. This clip, seen in the documentary *Chasing Ice*, was uploaded on YouTube in 2012 has been viewed 55 million times. Both calving events received attention from the media and public. Just six years apart, the recent Helheim calving event is a cry for attention towards climate change in the Arctic. Both media pieces shed light on the importance of understanding that climate change is happening. This is important because for many parts of the world, climate change occurs silently and slowly; whereas in Greenland, the impacts of climate change are visible. The video clips open discussion

to focus on the consequences of melting, and the impacts of melting towards other regions of the planet.

Snow Cover

Surface melt poses local threats to Greenland where the consequences interfere with daily life, and pose physical, sociological, and economic threats. A major Arctic change caused by climate change is decreased snow cover and albedo. Two drivers for decreased snow cover is increasing temperatures and rain. Increasing temperatures lead to phase changes, in the Arctic. Therefore, even a very small degree of warming can have large impacts. Warmer temperatures, can either prevent snow from forming or can melt it, and rain will melt snow cover. Less snow cover in the Arctic is highly consequential as albedo, the ability to reflect heat back, is negatively impacted. Heat is unable to be reflected from the surface and is absorbed, which accelerates warming in the Arctic (Osterkamp, 2007). In addition, the surface in Greenland is also darkening which means that more heat is further absorbed by the surface due to the impact darker colors have on albedo. The decreased albedo creates a positive feedback loop, and contributes to polar amplification. This creates a cycle where albedo is continuously negatively impacted due to warming; this in turn further intensifies the severity and the rate of climate change, making the Arctic particularly vulnerable.

Glacier Activity in Greenland

In Greenland, the ocean water gets warmer at increasing depths due to warm salty water being heavier than cold fresh water. With deeper waters getting warmer, the glaciers start to melt and calve from the bottom. The Helheim glacier is the most productive glacier. It stretches

across four miles and is 328 feet high, which is equivalent to roughly three times the Golden Gate Bridge, and the height of the Statue of Liberty (CNN, 2017). Between August 2016 to August 2017, NYU scientists say that Helheim Glacier retreated two miles; the furthest retreat the scientists had seen in a decade (CNN, 2017). A glacier this large would have devastating consequences if it were to continue melting at its current rate.

Both snow cover and glaciers are important elements of the environment that allows Inuit to maintain their way of life. These two aspects are key for the survival of livelihood, health, culture, and traditions. The above aspects are tied directly to their environment, and dependent on the health of the environment. This makes the Arctic vulnerable to climate in multiple ways.

Implications on Inuit

Food Security, Food Sovereignty, Culture

Climate change is a catalyst that creates other environmental injustices that take shape in multiple forms in Greenland that threatens food security and food sovereignty. This creates many implications for the people in Greenland. Food security “is the condition in which all people, at all times, have physical, social and economic access to sufficient safe and nutritious food” (United Nations , n.d.). Food sovereignty is “the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods” (Epting, 2018). Both food security and food sovereignty are important for Greenland, and are impacted by climate change caused by major carbon emitting countries.

Climate change threatens food security by posing barriers for Inuit to hunt. Due to unsuitable climate for farming, hunting has always been a way of life in Greenland. The hunting culture has existed in Greenland since “the first wave of immigration via Thule around 4,500

years ago” (Visit Greenland, n.d.). From conversations with the people we met in Greenland, I learned that hunting has become harder throughout the years. From interviews with traditional hunters, the Inuit Circumpolar Council found that “formerly safe travel routes had become insecure due to a warming climate and melting ice. Wildlife habits and migration routes were changing” (Inuit Circumpolar Council, 2012). Climate change does not create desirable foraging conditions for caribou, and is associated with the earlier growth of the plants they eat, which is especially detrimental when calves are born. Studies point to climate change as the primary factor linked to the decrease in caribou population (PennState Eberly College of Science , 2013). Similarly, seal populations have also faced survival threats due to climate change. Without sufficient snow cover on the ice, seals in the Arctic cannot construct proper birthing lairs; decreasing sea ice extent also reduces the available suitable habitat for seal pups, and could even lead to higher death rates of seal pups due to premature separation from mothers (National Snow and Ice Data Center, n.d.). Hunting caribou and seal have been cultural practices and a means of hunters bringing in food for the town, and climate change jeopardizes this culture and food security.

The ICC, in a report, emphasized the urgency of addressing food security in the Arctic. Stating “eating country foods is important not only because of their nutritional benefits but also because of the broader importance of harvesting in supporting traditional knowledge and skills” the report highlights that “[...] hunting is vital for Inuit not just for health and dietary reasons but also for the health of Inuit culture” (Inuit Circumpolar Council, 2012). Access to country foods and foods obtained from hunting is especially important in winter seasons, as such foods offer the necessary nutrition and caloric needs for the harsh Arctic winters. A threat to Inuit food security is also a threat to food sovereignty. Not only is it difficult to hunt for food, but the Inuit

start to lose their right and access to culturally appropriate food. Should climate change continue to threaten Inuit hunting, there are significantly devastating implications that could occur. For Inuit, “[the] linkage between food and culture is inextricable” (Inuit Circumpolar Council, 2012). There may be cultural suppression, and the culture and tradition knowledge of hunting may gradually discontinue.

With less ability to hunt for their own food, Inuit have started relying on Danish foods, integrating themselves into a dual food system comprised of country foods and Danish foods (Berrand-Ford, Ford, & Goldhar, 2012). Greenland is a small region separated by water bodies and glaciers, many supplies are either shipped or flown in to the different towns. Additionally, due to weather, visibility, and ice, towns must wait up to a month before being able to restock. Towns are in food shortages and experience increasing levels and severity of food insecurity. There is a high level of environmental injustice, as people in Greenland are burdened by food security and food sovereignty issues by climate change caused by others.

Another impact of warming in the Arctic is there is often not enough snow coverage to use sledge dogs to hunt. This practice has existed as long as the practice of hunting has, and is an inextricable element of hunting. Tobias, an Inuit from East Greenland, revealed in an interview with CNN that he used to be able to take his sledge dogs out to hunt in the middle of summer, and now some places do not even get enough snow to take the sledge dogs out. Now due to the lack of snow, he must now take his boat out to hunt for fish, seals, and whales. He states “hunting is my life”, but he can no longer rely solely on hunting as his source of revenue (CNN, 2017). If Tobias is not able to hunt to make his income, this means his family or town also do not get that food source. Inuit hunters, as Tobias stated, must use boats to hunt. This non-traditional means of hunting has a much larger carbon and is a source of carbon emissions which

contributes to climate change. Hunters are forced to shift away from using sledge dogs, which may subsequently lead to the practice and traditional knowledge surrounding the practice to diminish. The Inuit are in situation where the loss of culture and traditions are at stake.

The Big Picture

Sea Level Rise

A major consequence that arise from warming in the Arctic is sea level rise, this threat will be felt locally in Greenland, and around the world. CNN conducted a study that revealed that “meltwater from Greenland is the largest current contributor to global sea level rise”. The study found that overall ice loss has increased drastically over the last two decades: between 1992 and 2002 there was an average loss of 34 gigatons yearly, and since 2002 the average yearly loss soared to 280 gigatons. Putting this into perspective, “that’s enough meltwater for every person on the planet to drink 107 liters of water, every day of the year” (CNN, 2017). Most melt is occurring at hot spots, where glaciers flow into the sea. The study found that if the Greenland ice sheet was to completely melt, sea levels could rise by about 24 feet (CNN, 2017). Sea level rise will impact many coastal regions around the world.

Global Implications

There are many issues that arise from climate change in the Arctic, and climate change overall. It is important to note that the impacts that happen in Greenland does not stay in Greenland, there will be devastating consequences for the rest of the world. When sea levels rise, it does not happen evenly. This is because of how large ice sheets are, a mass change will impact the Earth’s gravity and rotation, affecting the distribution of meltwater. The Earth will be

impacted by sea level rise, but different regions will experience different levels of sea level rise. Though Greenland itself will not be directly impacted by sea level rise from glacier melt, other regions will be. A small degree of sea level rise may be detrimental for certain countries or regions, depending on factors such as adaptability, infrastructure, and available funds.

Climate scientists agree that just by the end of this century, there will be at least 3.2 feet of sea level rise (DeConto & Pollard, 2016). This will lead to devastating outcomes for the world's coastal cities. "Sea level rise will have increasingly serious consequences for human health and life quality, with coastal populations at risk for dislocation due to flooding" (National Aeronautics and Space Administration, n.d.). People who are most at risk and have no choice but to abandon their homes become environmental migrants. In addition, the world economy may also take a hit. In a forecast using the "business as usual" RCP, a study conducted by Asian Development Bank (ADB) found that "global flood losses are expected to increase to \$52 billion per year by 2050 from \$6 billion in 2005". In the same forecast, ADB predicts that "In some countries of Southeast Asia, rice yields could decline by up to 50 percent by 2100 if no adaptation efforts are made" (Caraballo, 2017). These are just a few examples of what significance that melting in Greenland and climate change has globally.

Philippines

NASA conducted a study and made predictions on how coastal cities around the world would be impacted if sea levels would rise by the predicted 3.2ft. These forecasts were made based on current trends. Located about 6,100 miles south-east from Greenland is the Philippines, laying just above the equator. The NASA study predicts that the coastal cities of the Philippines, Manila, Palawan, and Davao, will experience sea level rise of 3.59ft, and 3.57ft, 3.61ft

respectively, where 19.7%, 19.5%, and 19.2% respectively is from Greenland (National Aeronautics and Space Administration). Due to its geographical location, the Philippines is prone to typhoons. Sea level rise in tandem with climate change warming intensifies typhoons by increasing tropical storm wind speeds, and by strengthening coastal storm surge (Center for Climate and Energy Solutions, n.d.). With typhoons already causing huge damage to the Philippines annually, these factors that intensify the severity of typhoons could be devastating.

Case Study: Typhoon Haiyan

Typhoon Haiyan, known as Typhoon Yolanda locally, hit the Philippines in November, 2013. Recorded as one of the strongest tropical cyclones recorded ever, Haiyan had winds of up to 313km/h, and up to 281mm of rainfall, most of which fell in less than 12 hours. In addition, there were waves up to 7m in height along some coastal regions (BBC, n.d.). The catastrophic typhoon took over 7,000 lives. As a developing country, the Philippines did not have sufficient funds to better planning, protection; the typhoon cause disastrous economic, social, and environmental impacts.

Typhoon Haiyan caused a significant impact economically, causing an estimated \$5.8 billion (USD) in damage. Causing further destruction to rice, corn, and sugar farms, the Philippines international trade and farmers' income also took a hit. Over 71,000 hectares of farmland was impacted. The fishing industry and its' families were also affected with 30,000 boats and equipment left destroyed. In total, around six million people lost their source of income due to the damage. (BBC, n.d.). Overall the economic damage was massive, making a large impact on the developing country. In addition, the typhoon left 1.9 million people homeless. This pushed those who were displaced to move to towns that were less affected, leading to some

towns having doubled in population. There were also environmental impacts such as flooding that knocked over a tank, causing an oil spill near mangrove ecosystems. Further, major roads were blocked by trees, blocking regions from receiving aid (BBC, n.d.).

Following the typhoon, areas affected received aid from the Philippine military and the US military. Additional aid supplies and monetary donations were made to organizations to help the regions that were hit by the typhoon. This source of aid and money made recovery from Haiyan possible for the people and the government.

Discussion

Typhoon Haiyan, one of the strongest typhoons recorded, shows as an example of how climate change is connected around the world. A warming Arctic is linked to devastating natural disasters that are only getting stronger and occurring more often. This is extremely costly economically, socially, and environmentally. Countries like the Philippines are also victims of environmental injustice because they have contributed relatively little to climate change. As a developing country rich in natural resources, the Philippines also faces a trade-off between development and environmental protection. The country simply cannot just adapt to climate change with the current infrastructure and funds it has. This puts the Philippines in a situation where they have little choice but to face the consequences climate change brings to them.

Conclusion

Climate change has many impacts that affect people around the world on different levels. Due to how vulnerable the Arctic is, and how powerful of an impact warming in the Arctic can have, it is imperative to focus on Arctic regions. Warming in the Arctic causes many issues and

disruptions to people, there is much at stake for people in the Arctic. It is important to recognize this environmental injustice because these people have contributed so little to climate change, are the most vulnerable to it, and do not have the ability to adapt to climate change as easily as larger and more developed cities. Amplified warming in the Arctic causes more issues on a global scale. More regions and people will be harmed, and many do not have the resources to adapt either. On a global scale, there are economic, social, environmental, and cultural threats; all of which are very important. Climate change creates environmental justice on a global scale. Those affected tend to have contributed relatively less to current climate change and are less developed and have less resources to adapt. This globally connected system of environmental injustice must be addressed and considered when discussing climate change.

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