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Adapting to Environmental Crises: Humans' Resilience to Humanity

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Abstract:

This thesis addresses the modern adaptations of human societies in response to environmental crises during the times of Covid-19 and climate change. As humans continue to inflict destruction on the planet and each other, we must understand human adaptation as a response to human action and treat this action as one equal to the forces of nature. Chapter 1 discusses the concept that human action has evolved to be as powerful as nature in terms of destruction and catastrophic consequences on human society. This chapter addresses relevant data on the magnitude of human consequences, in the context of Covid-19 and climate change, and considers the histories of human destruction. Using an anthropological lens, chapter 2 analyzes the inefficiencies of human adaptation and discusses that humans tend to adapt with resistance in reaction to crisis, rather than prepare resilient strategies for that crisis. Chapter 3 addresses the weak international systems and politics that respond to these environmental crises (i.e. Coronavirus and climate change) and suggests that these systems were not built for long-term, international cooperation. Moreover, these systems typically offer resistant, reactionary methods and do not promote preventative, long-term adaptations. Chapter 4 focuses on the inequalities and injustices that follow sporadic and regional adaptations, specifically comparing more developed and less developed countries, arguing that without the structure of functioning international systems, humans will adapt regionally and often face social, political, and economic inequality. And finally, Chapter 5 offers recommendations for the future of adaptations, explaining that it would be more productive if humans relied on preparedness and resilience rather than resistance.

Keywords: Adaptation, Covid-19, climate change, international systems, environmental crises, resilience, catastrophe, security, resistance, mitigation.

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This thesis would not have been possible without the inspiration and encouragement from a particular professor and thought-provoking author I have been lucky enough to encounter during my studies. I have taken many classes throughout my time at Fordham, but none as reflective and challenging as those taken with Professor Garnet Kindervater. His explanations and discussions surrounding the Anthropocene and the future of humanity served as a great source of inspiration for this thesis and ultimately encouraged me to spend my senior year with this literature.

In his class *Catastrophe and Human Survival,* we read "A Short Treatise on the Metaphysics of Tsunamis" by Jean-Pierre Dupuy, a philosophical contemplation and recount of the aftermath and consequences of Hiroshima and Nagasaki. It was this piece that opened my eyes to the myriad of narratives surrounding human destruction and subsequent adaptation to crisis. Many ideas in this thesis were drawn from those narratives and the events of Hiroshima and Nagasaki will be recalled several times throughout the paper.

I want to thank Professor Kindervater and Jean-Pierre Dupuy for giving me the direction I was looking for when developing this topic. Professor Kindervater has been a source of consistent encouragement and guidance and Dupuy's writings have acted as a beacon when I get lost in my words. I am extremely grateful to have encountered these academics during my time at Fordham, and I once again thank them for all their help.

I would also like to thank Professor Van Buren for his guidance and encouragement during this process, to my roommates and sister for listening to my thesis explanation over and over again without complaint, and to my parents for making my education possible. You all have made my time at Fordham worthwhile.

Introduction: *Art in the Anthropocene:* Envisioning life among crisis

When the bombs were dropped on Hiroshima and Nagasaki the history of the world was changed forever. For the first time, the power of human destruction was displayed on the global stage and humanity proved to have powers equal to the forces of nature. The following decades saw immense technological, social, economic, and political advancement, both furthering the evolution of the human race and increasing our destructive capabilities. Humanity has now reached a tipping point in our history, one that requires the collective adaptations of societies not just to environmental factors, but to the very consequences of human action. Many have called this time the Anthropocene,[1] a new epoch where human interaction can be seen on the Earth's geological timeline. And though there is much debate on when this geological age began,[2] I find a more interesting question be, how can we adapt to the age of humans?

The destructive capacities of climate change and Covid-19 pose dangerous threats to the survivability of our species and humans must learn to live in a state of crisis. As a result, people around the world are beginning to imagine these futures and exhibit our daunting realities in unique and profound ways. One such artist, Mary Mattingly, exhibited her perception of life in the Anthropocene if humans do not adapt accordingly to the consequences of humanity. Mary Mattingly is a Brooklyn-based artist who combines photography, performance art, sculpture, and architecture to create poetic representations of human adaptation and survival in a world rocked by climate change and an evolving environment.[3] Her work is both a commentary and critique of human-environmental relationships and exhibits the dramatic consequences of human-based

[1] Crutzen and Stoermer, 2000.
[2] Waters, et.al., 2019.
[3] "Mary Mattingly", 2021.

environmental degradation.[4] What is most interesting about her work is her understanding of anthropogenic consequences and the seemingly human acceptance of those consequences.

Her most striking work comes from her collection "Home and Universe", a series of images that capture the weight of individual and communal consumption, reflecting on the life of objects and their impacts on ecosystems. Mattingly explains that her inspiration for this provocative piece came from looking introspectively at her own ecological footprint.[5] As a woman living in a consumer-based society, Mattingly became distressed at her way of life and her contributions to U.S. environmental degradation. In "Home and Universe", Mattingly gathered all of her possessions and combined them into seven separate sculptures wrapped in twine, built in a way that could be rolled or pushed. She then took these seven "balls of twine" to various locations and illustrated the weight of carrying her environmental impact with her wherever she went.[6]

Her work is a prime example of Art in the Anthropocene,[7] a shift towards environmental-based expression as many begin to grapple with human survivability in this rapidly changing world.[8] Mattingly's collection addresses key themes of the Anthropocene: human-based destruction, societal adaptation, and the efforts to continue normalcy in the face of crisis. It can often be difficult to envision the consequences or "weight" of human existence on our shared world, yet, Mattingly's depictions on the life of objects, from extraction to disposal, pushes viewers to reevaluate the prioritization of human domination and asks society to consider simple

[4] Schmidt, and Fassit, 2019.
[5] Mary Mattingly, 2013.
[6] "Mary Mattingly", 2021.
[7] Davis and Turpin, 2015.
[8] University of Michigan Museum of Art, 2019.

and adaptable strategies for survival, rather than continuing those destructive tendencies or methods that eventually crush humanity beneath the weight of our own destructive capabilities.

Figure 1. Home and Universe, Mattingly, 2013.

Figure 2. Home and Universe, Mattingly, 2013.

Mattingly's work exhibits that to live in the Anthropocene is to accept that humans have the power to destroy themselves, but to survive in the Anthropocene is to understand how we adapt to the consequences of human action will be the key to ensuring a livable future. That is what this paper will address: the complexities of adapting to crises that we created when our understanding of those crises is limited, specifically in the cases of Covid-19 and climate change where their impacts are constantly evolving. I argue that current methods of adaptation are ill-equipped to handle ongoing and future human-induced environmental destruction, and require a reevaluation if we are to increase the survivability of society. The first chapter describes the transformation of human destructive capabilities, from the rise of humanity to Covid-19 and climate change, arguing that human disasters have matched the forces of nature. Chapter 2 provides an anthropological perspective on human adaptability, focusing specifically on the shortcomings of resistance adaptation. Resistance, in this context, refers to reactionary adaptive

methods that are less efficient and effective than resilient adaptive strategies. The following chapter discusses inapt international systems and ultimately argues that these systems are not equipped to handle global adaptation and will contextualize their strategies through the lens of Covid-19 and climate change. Chapter 4 analyzes the inequalities that follow adaptation, highlighting the environmental injustices of adapting under an unequal system. The final chapter provides my recommendations, both on a structural and personal level, to adapting more efficiently to human-caused environmental disasters through prioritizing resilience over resistance.

Chapter 1: A History of Destruction: Humanity as a Force of Nature

On August 6th, 1945, over 120,000 people were killed in the Hiroshima and Nagasaki disasters. This disaster was not the result of a natural phenomenon, rather it was the consequence of immeasurable human destruction that had never been seen on such a scale. When the United States dropped two atomic bombs on Hiroshima and Nagasaki, a stain of human destruction was left on the geological and historical records that will remain for centuries. In the blink of an eye, hundreds of thousands of lives were erased or changed forever, all stemming from the impacts of human disaster.

It is widely accepted that humans have made a significant impact on the environment, but it is the degree of that impact that is often contested among academic circles. Debates surrounding the validity that humans have evolved to become equal to the forces of nature are becoming increasingly popular, especially as societies examine the human influence on climate change and Covid-19. Decades of human-based destruction and force have resulted in the complete devastation of livelihoods and ecosystem services, most notably the loss of biological controls (Covid-19) and provisioning, habitat, and cultural services (climate change). This

chapter analyzes the progression of that human force, from the Rise of Humanity to modern-day environmental disasters, and argues that the ability of the human race to destroy the environment, ecosystem services, and itself, has reached a point that is equal to, or possibly surpasses, the powers of nature.

The Rise of Humanity. The Rise of Humanity is largely attributed to the natural evolution of human intelligence and humanity's ability to adapt efficiently to an ever-changing environment. Biologically, humans are some of the most advanced species on the planet, but not because each individual is particularly astonishing, rather it is the collective of human intelligence and cooperation that makes human society some of the world's most destructive forces.[9] The history of human destruction began in ancient hunter-gatherer societies when humans began modifying landscapes through the use of fire.[10] The introduction of this new tool allowed humans unparalleled influence within the natural world as it could be used as a form of predation and protection that was completely unavailable to any other species. This advantage over other species placed humans as apex predators, allowing them increased access to more nutritious foods that ultimately resulted in the hominid brain size nearly tripling, "up to an average volume of about 1300 cm3, and gave humans the largest ratio between brain and body size of any species".[11] The genetic and social evolution of early humans enhanced their ability to manipulate and manage the environments in which they lived, however, their impacts on the natural world were still well within the boundaries of natural variability. Meaning, while they could contribute to the changes of natural systems, they had not yet acquired the ability to alter environments, thus generating unrecognizable landscapes.

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[9] Ord, 2021, 12.
[10] Steffen, Crutzen, and McNeill, 2007, 614.
[11] Steffen, Crutzen, and McNeill, 2007, 614.

The Agricultural Revolution. Once humans mastered the manipulation of natural resources, societies across the globe took part in the Agricultural Revolution, the first major alteration of atmospheric greenhouse gasses (GHGs) and a period of extreme population growth. The Agricultural Revolution is often considered the birth of humanity, as it made the activities of hunting and gathering almost obsolete, completely changing the dynamics of society. Further, the sheer size of human society has grown exponentially since the Agricultural Revolution as "agriculture reduced the amount of land needed to support each person by a factor of a hundred, allowing large permanent settlements to develop, which began to unite together into states".[12] Now, civilizations were not only cooperating for means of survival, but societies were also expanding their intellect and exploring avenues of science, medicine, mathematics, architecture, and technology. The increased cohabitation of humans allowed for the easier manipulation of natural systems, but their impact still did not reach the same magnitude as the forces of nature. Preindustrial societies lacked the technological advancement, economic organization, and societal purpose to be able to match the effects of natural disasters. So, while their impacts were apparent in various environments, they too remained within the confines of natural variability.

The Industrial Revolution. A few thousand years under established agricultural societies and the expansion of scientific and technological knowledge led humans into the next great period of anthropogenic change: The Industrial Revolution. It is often argued that the Industrial Revolution propelled humans into the next great geological epoch, the Anthropocene. This is due to the use of fossil fuels and the advancement of technology as it generated such substantial change in the natural world. It was the invention of the steam engine that had a particularly impactful effect on both human societies and their ability to destroy the environment. This life-

[12] Ord, 2021, 14.

changing advancement, and proceeding technologies, loosened the constraints of human development and allowed humans more access to energy, a global economy, increased population sizes, and more influence over the Earth's systems. It was this era that saw the greatest leap of technological development and human destruction of the environment. Before industry, the effects of humans were local or transitory but remained within the bounds of natural variables, the Industrial Revolution pushed those bounds to new limits and produced destruction to the natural world that could be seen in instances of natural disaster.[13] This destruction manifested itself in many forms, whether that be increased deforestation, pollution, or habitat fragmentation, but what really separates this era of human transformation was the production of GHGs (see figure 3). The burning of coal and oil produced massive amounts of carbon dioxide and methane gasses, dramatically altering the atmospheric composition of those gasses. The rise in composition was so dramatic that our impacts could now be seen on the geological record, though it was primarily in the form of carbon dioxide. It was the pollutive properties of the Industrial Revolution that tested the bounds of environmental variability as the atmospheric composition of GHGs became more unnatural, and it was this time period that allowed humans to test their limits as an environmental force.

[13] Steffen, Crutzen, and McNeill, 2007, 616.

Table 1. Atmospheric CO_2 concentration during the existence of fully modern humans on Earth. References given in notes below.

Year/Period	Atmospheric CO_2 concentration (ppmv)[1]
250 000–12 000 years BP[2]:	
Range during interglacial periods:	262–287
Minimum during glacial periods:	182
12 000–2 000 years BP:	260–285
Holocene (current interglacial)	
1000	279
1500	282
1600	276
1700	277
1750	277
1775	279
1800 (Anthropocene Stage I begins)	283
1825	284
1850	285
1875	289
1900	296
1925	305
1950 (Anthropocene Stage II begins)	311
1975	331
2000	369
2005	379

[1]The CO_2 concentration data were obtained from: (a) http://cdiac.ornl.gov/trends/trends.htm for the 250 000–12 000 BP period and for the 1000 AD–2005 AD period. More specifically, data were obtained from (34; 250 000–12 000 BP),(35; 1000–1950 AD), and (42; 1975–2000 AD). (b) CO_2 concentrations for the 12 000–2000 BP period (the Holocene) were obtained from (36). [2]The period 250 000–12 000 years PB encompasses two interglacial periods prior to the current interglacial (the Holocene) and two glacial periods. The values listed in the table are the maximum and minimum CO_2 concentrations recorded during the two interglacial periods and the minimum CO_2 concentration recorded over the two glacial periods. According to mtDNA evidence, the first appearance of fully modern humans was approximately 250 000 years BP.

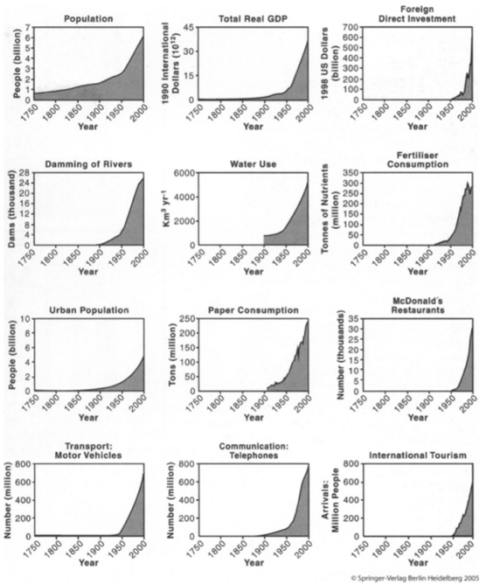

Figure 2. The change in the human enterprise from 1750 to 2000 (28). The Great Acceleration is clearly shown in every component of the human enterprise included in the figure. Either the component was not present before 1950 (e.g., foreign direct investment) or its rate of change increased sharply after 1950 (e.g., population).

Figure 3. The atmospheric changes of GHGs and the rise of human enterprise, Steffen, Crutzen, and McNeill, 2007.

The Great Acceleration and the Atomic Bombs. The Industrial Revolution may have propelled society forward into the Anthropocene, but it was the dropping of the Atomic Bombs and the Great Acceleration that solidified our position in the new geological epoch as destroyers of the natural world. As previously stated, the atomic bombs that were dropped onto Hiroshima and Nagasaki leveled the Japanese landscape and destroyed the natural and human environments in ways humans previously could not imagine. The effects were so dramatic that the Japanese victims did not have a word to describe the devastation that surrounded them. The only way they could describe such horror was by using the Japanese word *tsunami,*[14] as they equated the aftermath of the disaster to a tidal wave or earthquake. The two bombs used on the Japanese were also just a taste of what humans were capable of. The period of technological advancement that preceded the end of World War II saw the development of thermonuclear warheads that

[14] Dupuy, 2015, 31.

could wipe out millions of people in one targeted hit. In this case, humans not only held the power of natural disasters but were also leaving the limited capacity for natural devastation far behind. Never has there been a natural disaster that could annihilate millions of people in a matter of minutes, but now there are several human-made bombs that could produce those horrifying results. The Great Acceleration saw humanity's economic, societal, and political advancements pushed to limits unparalleled to the thousands of years of human advancement. Now societies prioritized "progress" and domination over the environment as well as each other, and as the world became globalized and so did human disasters.

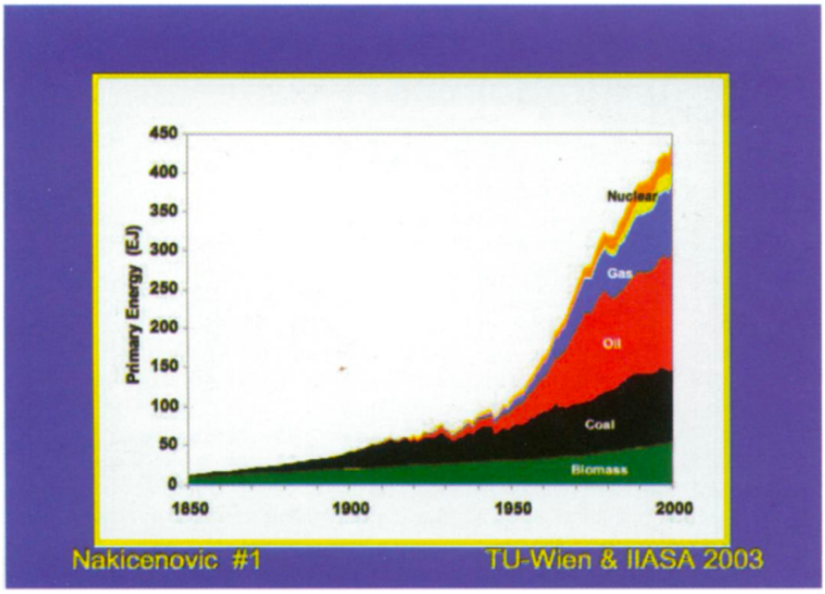

Figure 4. The mix of fossil fuels in energy systems at the global scale from 1850-2000. Steffen, Crutzen, and McNeill, 2007

Modern Day Disasters. The history of human-motivated environmental destruction is one of repeated mistakes and varying degrees of harm to ecosystem and societal health. It is also one that is constantly unfolding before us, making it an observable catastrophe that has and will continue to change the flow of human interaction and adaptation. Following the dropping of the atomic bombs and the Great Acceleration, human-environmental relationships were irrevocably changed as the capacity for human destruction moved well beyond the realm of environmental

variability and human-driven natural disasters generated high-impact and sometimes irreversible consequences. As of late, human-caused environmental disasters have absorbed news cycles and worked their way into the everyday conversations in society. The remainder of this chapter will discuss the two most notable instances of environmental catastrophe, Covid-19 and climate change, as they have both surpassed environmental variability and propelled society into an era of uncertainty and disarray, making our adaptations to them more important than ever.

Climate Change. When we think of disaster, we often characterize it as something sudden, fast-paced, with immediate consequences. Disasters like the atomic bombs had impacts that could be seen clearly upon impact, with imaginable, long-term consequences. The issue with climate change is that it is a slow-moving event and its degree of impact is not only varying in severity, its impacts can go unnoticed for decades until they have become permanent. For this reason, it has been difficult to argue that human-induced climate change, and its proceeding consequences, hold the same destructive capacities as natural disasters. However, in February 2022 the Intergovernmental Panel on Climate Change (IPCC), released a report finding conclusive evidence that "human-induced climate change… has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability".[15] Meaning, it should no longer be ignored or disputed that the mistreatment of the environment has and will generate disasters to the same degree as natural forces. Further, the report states with high confidence that the rise in weather extremes "has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt".[16] The damages to societal and ecosystem health fluctuate across geographies, but their cumulative impacts have generated human-induced natural disasters that will destabilize the balance of natural systems.

[15] IPCC, 2021, 7.
[16] IPCC, 2021, 8.

Climate Change- Ecosystem Damages. As stated above, the rise in extreme weather events has ultimately damaged the environment in ways that are either pushing the natural limits of adaptation or have moved beyond those limits creating irreversible changes to ecosystem health and services. A particularly important example of those damages is the loss of habitat and biodiversity among ecosystems. The loss of climate regulation and rise in extreme weather events, such as drought, flooding, hurricanes, or even by extension, the acidification of the oceans, has either diminished the populations of once-thriving organisms or wiped them out completely. Those that remain then face the problem of living in much smaller habitats as droughts increase the desertification of regions, floods and hurricanes destroy ecological communities, and ocean acidification strips aquatic ecosystems of their nutrient health.[17] It is important to note that these instances of environmental destruction are not unique to human-based environmental change. Rather, it is the fact that these environmental changes are human based that make these natural disasters so different from previous cases. Over time humans have caused ecosystem collapse on a global scale, a force that was once reserved for nature, but is now a force that has been obtained and unknowingly wielded by humanity. It is this force that sets these instances of environmental degradation apart as human-environmental relationships move beyond the realm of natural variability and push the limits of ecosystem adaptation.

Climate Change- Societal Damages The total impacts of climate change upon society are vast and interconnected, much too broad to be discussed in one section of a paper. Therefore, this section will briefly address two distinct aspects of climate change: water and food scarcity (provisioning services) and increased migration (habitat and cultural services). The issues of water and food scarcity and increased migration are the results of varying damages to ecosystem

[17] IPCC, 2021, 18.

health, many of which can be attributed to the examples in the above section. Water and food scarcity are oftentimes the consequences of drought, a disturbance to ecosystem health that can be seen worldwide. Higher temperatures have led to decreased rainfall across the globe and that lack of rainfall has depleted freshwater sources and caused the desertification of once arable land. The rise in water and food scarcity is a further contributing factor to the increases in migration seen across the globe. As communities lose access to clean freshwater and their food sources become less and less abundant, many are choosing to flee their land in search of more stable living conditions. Migration can also be a result of human habitat loss from flooding and hurricanes, rises in zoonotic diseases (as will be discussed below), and increased environmental-based violence as resources become scarce. These damages to societal health are far-reaching, yet they can be attributed to the shared origin of human-induced climate change.

Covid-19. Unlike climate change, the Coronavirus pandemic falls more in line with the typical description of a disaster. It is fast paced, almost immediately producing consequences, generating global impacts, and permanently shaping the way humans interact in the world. It is a disaster that has forever changed the way our society operates and sees the world, and it is one that was ushered forward by humans. The unhealthy relationship between humans and animals is the widely accepted origin of Covid-19, as humans engaged in the trade and consumption of wild animals, greatly increasing the probability of zoonotic pathogen spillover and ultimately creating a niche of human hosts for the virus.[18] The virus then spread at a rate unforeseen in modern history and the lives of every human on Earth were upended and dramatically altered as we rapidly adapted to this unprecedented natural force. The Covid-19 pandemic is a prime example of human-induced natural disasters, not only because of our interaction with wild animals, but

[18] Zhou, Yang and Wang. *et al.* 2020.

because of the overall disastrous handling of the outbreak. This pandemic not only proved that human destruction can move beyond natural variability, but it also showed us that we are ill-equipped to handle human-induced natural disasters.

Covid-19- Ecosystem Linkages. As stated above, the Covid-19 pandemic is a direct result of deteriorating human-environmental relationships. Not only did the mistreatment of human-environmental relationships cause this global health disaster, it will likely be worsened by increasingly poor environmental health further contributing to environmental degradation. The loss of biological controls amid the pandemic is an unfortunate byproduct of the absence of distance between humans and wildlife. Humans have always interacted with wildlife in some form or another, but there has been a loss of separation between humans and wildlife, propelled by the economic sector, that has diminished this natural barrier of space. Without adequate space between humans and wildlife, there is a loss of the biological controls of diseases and a higher probability of zoonotic spillover.[19] The pandemic has also had negative impacts on overall ecosystem health in the form of increased waste (predominantly single use plastics) and reductions in waste recycling programs. As millions stayed within the confines of their homes for months on end, societies saw an increased demand for delivered goods, resulting in a rise in packaging wastes.[20] Many were also encouraged to use single-use plastics, such as utensils or food containers, to prevent the spread of the virus and promote personal hygiene, further increasing total human waste. Disposable masks have become part of daily life, consequentially filling our landfills, oceans, and ecosystems, and it is unlikely they will go out of fashion any time soon. There has also been a dramatic increase in medical waste; Wuhan for example, "produced an average of 240 metric tons of medical waste per day during the outbreak,

[19]Quammen, 2020.
[20] Zambrano-Monserrate, Ruano, and Sanchez-Alcalde, 2020.

compared to their previous average of fewer than 50 tons".[21] All this to say, there have been some improvements to ecosystem health as there was a temporary reduction in transportation and production pollution,[22] but as societies attempt to slip back into normalcy, I anticipate those emissions rising to record numbers.

Covid-19 Societal Damages. The damages of Covid-19 upon society are endless and ever growing, however the most notable damages are the dramatic declines in mental health, ongoing impacts to physical health, and the reorganization of society, though I will discuss that particular impact in Chapter 3. Since the start of the pandemic in 2019, the overall mental health of societies took severe hits as people were forced to isolate and quarantine in their homes. Human interaction was limited to immediate family members or roommates and many experienced an increase in anxiety, depression, violence, and insomnia. Several studies found that during peak-pandemic times, children were more likely to develop acute stress disorder, adjustment disorder, and grief and up to 30% of children experienced posttraumatic stress disorder after quarantining.[23] Further, studies show that young people in college felt an uptick in anxiety as 24.6% of students experienced increased stress due to the pandemic.[24] And healthcare and essential workers experienced the highest volume of mental health cases as 50.4%, 44.6%, 34.0%, and 71.5% of all participants reported symptoms of depression, anxiety, insomnia, and distress, respectively.[25] Beyond mental health impacts, the general physical health impacts were felt worldwide and as of April 5th, 2022, there have been 499,119,316 recorded cases of Covid-19 and 6,185,242 deaths as a result of the virus.[26] Beyond case count, many have suffered what

[21] Zambrano-Monserrate, Ruano, and Sanchez-Alcalde, 2020.
[22] Zambrano-Monserrate, Ruano, and Sanchez-Alcalde, 2020.
[23] Kontoangelos, Economou, and Papageorgiou. 2020.
[24] Kontoangelos, Economou, and Papageorgiou. 2020.
[25] Kontoangelos, Economou, and Papageorgiou. 2020.
[26] "Who Coronavirus (COVID-19) Dashboard." 2022.

scientists call “long Covid” or the persistence of Covid-19 symptoms as a result of organ damage, post viral syndrome, post-critical care syndrome or other unknown factors.[27] Needless to say, the impacts of Covid-19 on societal health are vast and continuing to grow as we further our understanding and interaction with the virus. Thus, it cannot be denied that this disaster has moved well beyond natural variability and pushed society into what seems to be a never-ending human-induced environmental crisis.

Chapter 2: An Anthropological Analysis of Human Adaptability

Human evolution has been dependent on our ability to constantly adapt to a changing environment. Civilizations have more than proved that they can succeed at adapting to ecosystems, however, our level of adaptability may become strained as we continue to use inefficient modes of adaptation or resist the conditions to which we must adapt. Therefore, to better understand the complexities and limitations of human adaptation, there must first be an anthropological analysis of human adaptability. This chapter addresses the various processes as well as the inefficiencies of human adaptation and argues that current focuses on resistance, and therefore, reactionary methods are inapt if we are to survive the complexities and dangers of climate change and Covid-19.

Adaptive Processes. Adaptation in natural systems is the product of a species’ adjustments to stressors that have emerged in an environment that in turn affects the inhabitants of that environment, human adaptability is no different. For hundreds of thousands of years, humans have undergone immense adaptation processes resulting in the overall evolution of our species. These adaptations typically come in two forms: genetic and socio-cultural. Genetic adaptation “involves changes in gene frequencies that confer a reproductive advantage to the

[27] Raveendran, Jayadevan, and Sashidharan. 2021.

population in a particular environment".[28] In other words, a genetic adaptation is a physiological response to an environmental stressor that can occur at both the individual and collective levels, which will in turn elevate the survivability of a group. To a certain degree, genetic adaptations in humans are characterized by phenotypic plasticity, or the ability to alter a phenotype in response to an environmental change, therefore creating unique genetic adaptations that are dependent on the environment.

Due to the human phenotypic plasticity, genetic adaptations have manifested through a variety of physiological features, thus creating unique human traits that have been passed from generation to generation. For example, humans that originated from high-altitude environments have adapted impressively and relatively quickly to such harsh ecosystems. Adaptive qualities primarily from the Himalayas and Andes can be seen through "markedly increased blood flow and oxygen delivery to the uterus during pregnancy, substantially reducing the risk of babies with low birthweight,"[29] therefore increasing the survivability of the population. There is also evidence that humans have adapted based on the climatic conditions of the environment. Most notably, those who live in colder climates tend to follow Bergmann's rule, having rounder bodies, and Allen's rule, having shorter limbs, therefore evolving to have "larger, stockier body shape, presumably to improve thermal efficiency."[30] What will be interesting to see in the coming decades is whether or not there will be advantages or disadvantages to such rapidly changing environments depending on the varied physiology of humans. The loss of ecosystems and the rise in temperature is sure to have an effect on human populations, and though we can

[28] Moran, 2019, 4.
[29]Pritchard, Pickrell, and Coop, 2010, 1.
[30]Pritchard, Pickrell, and Coop, 2010, 1.

develop socio-cultural adaptations quickly, genetic adaptations take generations to emerge which in turn could have adverse effects on the survivability of humanity.

While it is undeniable that genetic adaptations are prevalent in human society, nongenetic forms of adaptability are much more common among the species. Nongenetic forms of adaptation are considered to be "cultural" or "social" adaptations as they generate shared adjustments in the behaviors of several individuals instead of a singular organism. The primary differences between cultural and social adaptations are in their application as "cultural adjustments include a broad repertoire of knowledge about nature, including knowledge of house construction, clothing styles, subsistence technology, and ritual", whereas "social adjustments mainly include forms of social and economic organization".[31] In this context, these adaptations are merged to become "socio-cultural" adaptations as they work in congruence with one another to create an infinite number of flexible adaptation varieties and therefore give structure to changes in habitat and inter-human relations. These adjustments are considered the "shared knowledge" of a given society and are passed on from generation to generation until the adaptation becomes human nature. The adjustments that are made are based on three categories: developmental, acclimatory, and regulatory adjustments. A developmental adjustment occurs during the developmental period of an individual and yields irreversible changes to the physiological tendencies of the organism.[32] Acclimatory adjustments, on the other hand, occur at any point after the developmental period and are considered to be physiologically reversible if deemed necessary.[33] A regulatory adjustment is by far the most common human adaptation and is considered to be "more flexible than developmental or acclimatory adjustments because they

[31] Moran, 2019, 83.
[32] Moran, 2019, 7.
[33] Moran, 2019, 8.

involve less commitment from the physical organism and can be acquired promptly by learning from others".[34] Each of these adjustments contributes to the adaptability of the human species and humans have become dependent on these tendencies in order to survive in their evolving ecosystems.

Genetic and socio-cultural adaptations offer two distinct insights into the mechanisms of human evolution, though they reach a point of convergence when considering the environmental psychology and preceding psychological adaptations of humans. These linkages between the human psyche and the natural environment have always existed, however they were not popularized in academia until Darwin's theory of human evolution when he united the mental and physical worlds of natural selection. His theory argued that humans evolved in part due to the cognitive selection of mates based on both adaptive and non-adaptive features, meaning there is a cognitive feature to selecting a mate that goes beyond pure instinct.[35] In this way, human psychology and adaptation are intertwined as humans are psychologically aware of their reproductive, and ultimately, evolutionary choices. Therefore, if humans can be cognitive of their evolutionary choices when choosing a mate, they may also be aware of their adaptive nature when placed under environmental stressors. This argument surrounding the cognitive environmental psychology of humans has expanded to many facets of the academic world,[36] but those pertaining to this topic involve the human reaction and understandings of climate change and Covid-19, specifically regarding the limitations it places on our adaptive capacities, an issue that will be touched on later in the chapter.

[34] Moran, 2019, 8.
[35] Darwin, and Alden. 1886.
[36] Barkow, Cosmides, and Tooby, 1995.

Inefficiencies. The study of human adaptation is not a new concept, yet it is a rapidly growing field as adapting efficiently becomes a more pressing matter. And while the adaptations of humans are vast and have stretched across generations of societies, there are limitations and barriers to these adaptations that have the potential to make them, and our understanding of them, inefficient. When discussing the limitations and barriers of adaptation, there is a common misconception that the two are the same, however, there is an important distinction that a barrier can be overcome while a limitation places a finite constraint on adapting. In a study and review of 81 research journals on modern human adaptation, researchers found that barriers typically stem from three categories: "the individual actor, the policy or governance process of developing and implementing adaptations, and the enabling and constraining context in which adaptation takes place".[37] Further, these barriers are also influenced by the intended goal of the actor and the context in which they occur. Meaning, what is a hindrance to one society or culture may not be to another, making the nature of adaptations extremely dependent on the region in which a society resides. For example, a barrier to climate change mitigation may be the fragmented schools of governance in play when creating adaptive policy.[38] When there are so many voices involved during the creation of global action plans, many aspects of adaptation can be overlooked, such as the water rights of a region or the land ownership of another, thus creating barriers to complete and competent adaptive strategies.[39] These barriers can be overcome through increased discourse and a more holistic approach to policy, but I will save that discussion for Chapter 3.

[37]Biesbroek, Klostermann, Termeer, and Kabat, 2013, 1126.
[38] Mearns and Norton. 2012, 33.
[39] Mearns and Norton. 2012, 34.

As stated above, the limitations of human adaptation are more restrictive than barriers as they prohibit the advancement of society due to both social and ecological factors. The ecological limitations on adaptation are largely a cause of biological controls over humanity, those controls include genetic and physical restraints. The more socio-cultural limitations on adaptation fall under endogenous categories as they emerge from *inside* society.[40] These limitations typically fall under four dimensions of society: ethics and values, knowledge of crises and consequences, risk assessment, and social importance of culture and place.[41] The ethics and values of a society determine its ability to adapt due to the ultimate goals of adaptation and "the existence of diverse, and sometimes incommensurable, values held by the actors involved in decision-making around adaptation can act as limits if these values are not deliberated".[42] Further, the values and ethical stances of those who hold the decision-making powers to adapt as a collective also determine a society's ability to adapt effectively as the few determine the social, political, and economic outcomes of the many. And while it can be argued that the individual can adapt independently, it is the social adaptation strategy that holds more weight in the grand schema.

As previously mentioned in the discussions of the processes of adaptation, the shared knowledge of society is integral in adapting and ultimately determines the success or failure of an adaptation. A lack of knowledge therefore can limit a society's ability to adapt, however, that knowledge is purely dependent on the agent the society is adapting to. Meaning, if a society does not have a robust understanding of an environmental stressor, for example, climate change, then their capacity to adapt efficiently is limited as they can only adapt to what they understand. This

[40]Adger, Dessai, Goulden, Hulme, Lorenzoni, Nelson, Naess, Wolf, and Wreford, 2008, 338.
[41]Adger, Dessai, Goulden, Hulme, Lorenzoni, Nelson, Naess, Wolf, and Wreford, 2008, 338.
[42]Adger, Dessai, Goulden, Hulme, Lorenzoni, Nelson, Naess, Wolf, and Wreford, 2008, 338.

can be argued as a barrier as a society can eventually acquire knowledge on that stressor, but until that knowledge is shared between the individuals, it remains a constraint on their adaptability.

The third socio-cultural limitation to adaptability is centered around risk assessment and the collective decision to ignore and resist risks or diminish their significance as a threat. Even if society has knowledge of a given risk, for example, Coronavirus or climate change, they may choose to be complacent as they do not perceive that crisis as a big enough threat to use adaptive strategies that change their way of life. Even if risks are prevalent, but there is no risk perceived, then little if any action to adapt is undertaken and society becomes limited in their ability to adapt to that stressor.[43] This limitation has become increasingly clear in recent years as many societies choose to ignore the dangers of climate change and Covid-19. This again could be a result of the human inability to imagine a distant future as "the mind still works comfortably backward and forward for only a few years, spanning a period not exceeding one or two generations".[44] Further, the lack of adequate risk assessment and resistance to environmental stressors could also be a byproduct of the school of thought of human exceptionalism: the ideology that whatever problem nature poses, humanity now released from the traditional confines of ecology, can generate any and all solutions.[45] Placing the capacity of human adaptation above or beyond natural systems has increasingly yielded poor results as humans fail to adapt efficiently to Covid-19 and climate change. Our inability to grasp the scope and risk of Covid-19 and climate change has limited the development of socio-cultural adaptations, and ultimately resulted in a higher volume of environmental crises.

[43]Adger, Dessai, Goulden, Hulme, Lorenzoni, Nelson, Naess, Wolf, and Wreford, 2008, 346.
[44] Wilson, 1993.
[45] Wilson, 1993.

The fourth limit to human adaptability is the value that societies place over the continuity and survival of culture and place. It is important to note that "all societies have affective ties between individuals, communities, and their material environments, and changes in the environment affect individual and collective constructions of reality".[46] If a society cannot imagine a reality without certain ties to culture, community, environment, and material resources or possessions, then it becomes difficult to adapt to stressors that threaten those cherished elements of life. Therefore, adaptation becomes limited within the eyes of the affected as they can only progress so far as they can envision their culture's survival, when in reality an adaptation may require the abandonment of certain aspects of that culture.

Resistant Reactionary Methods. The above discussion on the limits and barriers of human adaptation provides insightful evidence to the primary root of problems among modern adaptive strategies, that of the resistance to environmental stressors. Adaptive resistance refers to the human ability to avoid suffering significant adverse effects from potential threats,[47] and in this case those threats include the consequences of Covid-19 and climate change. Resistant methods of adaptation are not as widely encouraged as they are practiced, meaning while policy reports and organizations may promote more effective adaptive strategies, such as resilience and mitigation methods, they tend to apply more resistant methods of adaptation. And it is truly the application that counts when considering the adaptations necessary to increase the survivability of humans in the face of Covid-19 and climate change. In the wake of environmental crises such as these, resistance often transforms from actions taken to avoid that which threatens the security

[46]Adger, Dessai, Goulden, Hulme, Lorenzoni, Nelson, Naess, Wolf, and Wreford. "Are There Social Limits to Adaptation to Climate Change?", 349.
[47] Field, Barros, Stocker, Dahe, Dokken, Ebi, Mastrandrea, et al. 2012, 38.

of an individual or system, and generates a purely reactionary response, one that is unlikely to hold as an efficient adaptation to that stressor.[48]

In the case of climate change, resistant methods are most prominent when a given society chooses to uphold the standards of normalcy rather than accept the immanent dangers of climate change and make adjustments to combat those dangers. The term "global warming" was popularized in the mid-1970s when Wallace Broecker introduced the idea of human-induced climate warming in his research on atmospheric greenhouse gasses.[49] Since then, climate science has exploded, producing countless papers, studies, and policy recommendations on the most effective ways humans could adapt to a global rise in temperature. Decades of research has yielded clear results: humans have not only propelled themselves into an era of dramatic climate change, but we must also adapt to those changes to secure the survivability of our society. And yet, even with that clear understanding, we have done little to implement effective adaptation strategies, instead resisting the dangers of climate change and continuing the unsustainable methods that are attributed to climate change. This resistance to climate change is a result of the four limits to adaptation discussed above, the most prominent being those of inadequate risk assessment, and contributing human exceptionalism, and the inability to imagine a reality without the survival of culture and place. The application of resistant adaptive processes stems from a shared reduction in the risk of climate crises, as many of those risks will not be realized for years and therefore are not seen as an immediate threat. Additionally, many believe that since humans have moved beyond the realm of natural variability, they have the means to control or even outsmart the most powerful forces of nature, a belief that is continuously proving to be

[48] Evans and Reid. 2013, 85.
[49] Broecker, 1975.

untrue. Further, many would choose to prioritize the continuation of culture and place today rather than make adjustments to those aspects of society that would create a resilient model, one that could survive the future dangers of climate change.

The past two years have further exhibited the inefficiencies of socio-cultural adaptation as many societies have chosen to resist adequate adaptation strategies to Covid-19. In the beginning of the pandemic, adaptations were swift and widespread as many went into lockdown, mask mandates were implemented, and the race to a vaccine began. And though these measures prevented the spread in many areas, after a few months of quarantine many became weary of this new "normal". Barely a year after Covid gained a stronghold in the United States, several states including Texas, Idaho, and Mississippi dropped their mask mandates and reopened businesses to 100% capacity, despite the 30 million cases and 500,000+ deaths that had rocked the nation by March 2021.[50] By that time, the vaccine rollout was still at its inception and many countries were months behind receiving any kind of dosage. And yet, many desired a preservation of culture and a devaluation of risk over the safety and security previous socio-cultural adaptations provided. Additionally, many chose to willingly ignore scientific facts about the virus and instead follow the belief that the virus is a hoax, not dangerous, or not their concern, a decision influenced by the ethics and values of a given region. Overall the socio-cultural adaptations to Covid-19 and climate change have been stunted by the barriers and limitations of human adaptation. And while society cannot entirely count on rapid genetic adaptation to combat these crises, societies can learn from and choose to overcome those obstacles to socio-cultural adaptation and ensure the survivability of the human world.

[50] Holder, 2022.

Chapter 3: Ill-Equipped International Systems and their Environmental Policies

Since the spread of industrialization, anthropogenic environmental destruction has become globalized, and those systems that both perpetuate and counter the security threats of destruction have in turn become a globalized network of international policymakers. In plain terms, these policymakers hold the power to dictate the future of human-environmental relationships as they determine international and domestic regulations, bio/geopolitical systems, and collective responses to crises. Therefore, the decisions of these international actors carry immense influence over the greater international community, even if those decisions are weak when considering the adaptability of international environmental politics. This chapter addresses the weaknesses of these international systems and their consequential responses to environmental crises.

What are these systems? There are several players in global environmental politics, the most notable include nation-states, intergovernmental organizations (IGOs), nongovernmental organizations (NGOs), and multinational corporations. It is important to first discuss the mechanisms and degree of influence of these players as they hold the most power over global responses to climate change and Covid-19. Without these international bodies of governance, adaptation would be too sporadic and leave little room for collaboration and cooperation. That collaboration and cooperation should be more efficient and accountable, as I will discuss below, but they at least provide a framework and foundation from which international adaptive strategies can grow. And though each of these systems varies in influence and intention, the most influential of all is that of nation-states.

Nation-states are clearly defined, relatively homogenous communities that are territorially bound to a sovereign area. Within the realm of international relations, they hold four clear attributes— a permanent population, a defined territory, an effective government, and internal as well as external sovereignty.[51] And in the context of environmental politics, they can adopt and implement economic and environmental policy, regulate trade, and decide what environmental issues are brought to the international table.[52] Oftentimes, these decisions are swayed by popular domestic opinion, and therefore the culture, place, ethics, and values of a particular state may hold immense weight over the greater globalized community. This can be especially dangerous when a state's position on a global environmental issue is reflected by the interests of the dominant socio-economic elite,[53] as is seen in many capitalist countries such as the United States. Further, a nation-state can create, implement and expand international environmental regimes, a regime being "a system of principles, norms, rules, operating procedures, and institutions that actors create to regulate and coordinate action in a particular issue area of international relations".[54] There are various roles in nation-state regimes and each of these roles holds a vital position in international environmental relations as they ultimately determine the global intention of environmental policy. That environmental policy then emerges in forms of mitigation and adaptive strategies that can have both positive and negative effects over the international community, a complexity that is especially convoluted in the context of climate change and Covid-19.

Another actor in international environmental politics and regimes is intergovernmental organizations (IGOs). An IGO is a coalition of representatives from member states that can take

[51] "Montevideo Convention on the Rights and Duties of States", 1933.
[52] Chasek, Downie, and Brown, 2014, 45.
[53] Chasek, Downie, and Brown, 2014, 45.
[54] Chasek, Downie, and Brown, 2014, 32.

initiative and influence outcomes of global issues;[55] The United Nations' Food and Agriculture Organization and World Health Organization are examples of some of the world's most influential and active IGOs. IGOs play a significant role in the decision-making process of international policy as it is usually these organizations that bring global attention to various issues. The United Nations Environment Programme, for example, "identifies critical global environmental threats requiring international cooperation"[56] and initiates negotiations between states on international policy. Next to nation-states, IGOs hold the second highest influence over human adaptation as they are one of the central points of strategy exchange, negotiation, and hold the power of socially shaming nation-states on a globalized platform.

Nongovernmental organizations (NGOs) play a similar role in international politics, though they are defined as having

> "expert knowledge and innovative thinking about global environmental issues acquired from years of focused specialization on the issues under negotiation… dedication to goals that transcend narrow national or sectoral interests, and representing substantial constituencies within their own countries and thus can command attention from policymakers because of their potential ability to mobilize these people to influence policies and even tight elections".[57]

NOGs are considered unique as they tend to hold little political stake but can sway political influence across transnational boundaries through their specialization in public awareness and definition of environmental issues. Further, they can affect the overall adaptive strategies of the international community because of their distinct influence among civilians. These international players are explicitly designed by the shared knowledge, ethics and values, and culture of a given region making them extremely specialized and targeted towards clearly defined issues. NGOs

[55]Chasek, Downie, and Brown, 2014, 49.
[56]Chasek, Downie, and Brown, 2014, 50.
[57]Chasek, Downie, and Brown, 2014, 61.

such as Friday's for Future[58] and World Wildlife Fund[59] have become particularly important in global environmental politics as they create new knowledge in the environmental activism field and bridge the gap between local and international policies.[60] This international actor varies the most in scale, from tiny grassroots organizations to multinational efforts,[61] but their size does not diminish their importance as it is their combined volume that holds weight over environmental policy.

The final international actor in international environmental policy is multinational corporations, possibly the most dangerous threat to global adaptation. Multinational corporations often oppose global environmental protections as they conflict directly with their economic aims, and therefore attempt to influence policymakers to prioritize economic prosperity over environmental well-being. Further, corporations often have "good access to decision makers in most governments and international organizations and can deploy impressive technical expertise on the issues in which they are interested".[62] Through the use of lobbying, buyouts, and trade-offs, multinational corporations can sway political opinion over environmental policy, making them a barrier to international adaptation.

Each of these four international actors holds significant influence over the nature of human adaptation. Whether that influence is the result of the emission levels of a nation state or the lobbied interests of a multinational cooperation, the consequences of these global actors can be seen in nearly every facet of life. They are prevalent in this discussion not only because of the power they hold over adaptation, but also because of the limits they place on the capacity of

[58] Fridays for Future, 2022.
[59] WWF. World Wildlife Fund, 2022.
[60] Jasanoff. 1997, 9.
[61] Jasanoff. 1997, 9.
[62] Chasek, Downie, and Brown, 2014, 65.

human adaptation. Each of these actors can be seen as a limiting factor or a barrier to human adaptation due to their inability to act on the policies they work so hard to create. Rather than following through with the adaptive and mitigation strategies designed to promote a resilient international community, these actors respond with resistance to environmental crises, therefore increasing the vulnerability of our global system.

How do they respond? This section will address the responses primarily of nation-states and intergovernmental organizations, as they are the two most influential and reactionary systems in global environmental politics. Traditionally, the overarching goals of international political systems are to promote international security. Therefore, the notion of security implies that societies are under a near-constant threat of danger,[63] and must generate adaptive strategies to combat that danger. This can become increasingly difficult when the security of a nation-state is dependent on the actions of another, as is the case with global environmental change. The globalization of environmental problems has created an interdependency between nation-states that has grown with the rise of atmospheric change, and most recently with the pandemic.[64] This interdependency is key in understanding global human adaptation as the actions of one nation-state can hold immense positive and negative effects over another. Therefore, a nation-state can respond in two ways: either it will react and adapt on its own, creating national environmental policy, or it will coordinate their efforts with other nation-states, creating bilateral or multilateral environmental policy.[65] This policy will then be dependent on the perceived severity of the danger, varying due to the longevity and proximity of the crisis. The United States, for example, has created decades long adaptive strategies to climate change, but reacted almost immediately to

[63] Evans and Reid, 2013, 83.
[64] Biermann and Dingwerth, 2004, 6.
[65] Biermann and Dingwerth, 2014, 6.

the coronavirus pandemic. The adaptive strategies deployed followed both types of responses: climate change strategies being more of a seemingly multilateral effort while Covid-19 policies followed a national adaptive protocol, a difference I will discuss later in the chapter.

Intergovernmental organizations respond slightly differently to global environmental changes, in that much of their job is dedicated to the research and knowledge growth of issues and to make nation-states aware of potential and ongoing threats. IGOs also serve as mediators to nation-state conflict and collaboration and can ultimately sway the opinions of member states. They respond to environmental crises depending on whether or not they are a normative or functional organization. A normative organization is one that was created due to a specific mandate and is used to supervise a regime of international law, whereas a functional IGO exists to perform specific, distinct tasks such as collecting data on changing weather patterns or establishing migration transportation services.[66] While they work in conjunction with each other, it is the normative organizations that tend to be the leaders in crisis response[67] as they aim to create policy based on the findings from both functional IGO's and their own research. Normative IGOs therefore, respond with higher political engagement; they hold crisis conventions, draft adaptive international law and policy, and seek to implement adaptive strategies among nation-states.[68] To put it in the context of Covid-19 and climate change, both normative and functional IGOs act as the middle ground between nation-states and their most important function is to generate policy output.[69] That policy must be influential and practical, for without that output the legitimacy and productivity of the IGO is questioned and they risk a loss of funding from environmental regimes and individual nation-states.

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[66] Hall, 2015, 81.
[67] Hall. 2015, 82.
[68] Tallberg, Sommerer, Squatrito, and Lundgren, 2016.
[69] Tallberg, Sommerer, Squatrito, and Lundgren, 2016.

Why are they weak? The issue with international political systems is that many still propose adaptive strategies that operate within the same schools of thought that created the conditions under which we must now adapt. As discussed in the previous chapter, systems that attempt to create resilient adaptive strategies often back out in the application process and ultimately generate resistant adaptive responses. This reality is no different in the case of nation-states and IGOs. Too often are policies littered with language signaling towards resilience, preparedness, and mitigation strategies when practices prove to support resistance. Whether this is due to the economic interests of nation-states or the fear of going against the geopolitical norm among IGOs, the results tend to be the same: not enough is being done to adapt efficiently and effectively to environmental crises.

Take the most recent climate change adaptive strategies as an example; the IPCC has released several reports in the past decade signaling towards immediate climate change adaptation and mitigation policy.[70] Yet, at COP 26 little was done to ensure that countries would follow through with their promises to implement pro-climate practices. From an activist standpoint, the outcomes of COP 26 were dismal. Leaders from around the world signed the Glasgow Climate Pact, a series of decisions and resolutions that build on the 2015 Paris accord, yet these decisions were not legally binding and did not stipulate the specifics of what each country must do.[71] And even those aspects of COP 26 that may seem like a win, such as the emphasis on adaptation among less developed countries (LDCs)* and the primary goal of keeping global warming at or below 1.5C rather than 2C,[72] are nothing but empty promises in the

[70] "Reports." IPCC. 2022.
[71] Carver, 2022.
[72] Carver, 2022.
*It is important to note that I understand the negative connotation associated with using the terms "less-developed" and "more developed" countries. I am using these terms in this paper due to the scholarship I engaged with, much of which uses this language. For on the debates surrounding these international relations terms, see here: https://www.un.org/en/development/desa/policy/cdp/cdp_background_papers/bp2014_21.pdf

absence of clear strategies for application and accountability among nation-states. The outcomes of COP 26 are the latest in a long line of climate conventions seen throughout the 2000s, and if we are to reflect on those past outcomes, the agreements of COP 26 will likely yield similar results.

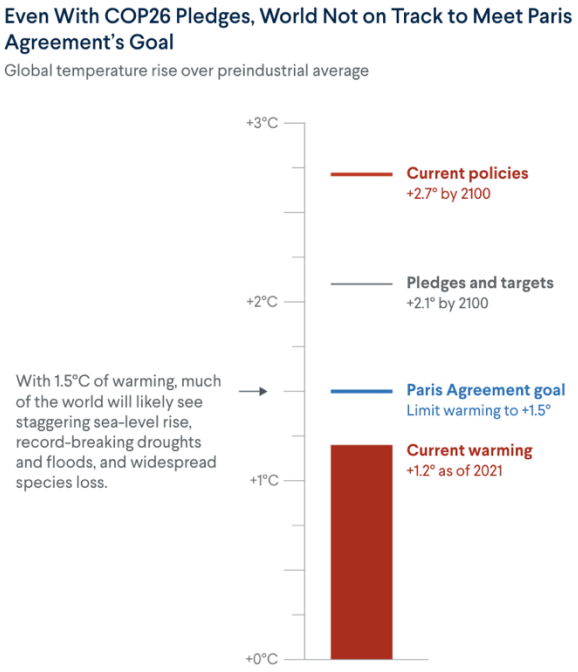

Figure 5. Current policy application is not on track to meet the Paris Agreement goals, Carver, 2022.

Two of the most promising, and seemingly disappointing adaptive climate strategies among international systems were the Kyoto Protocol and the Paris Climate Agreement (PCA), international treaties that not only acknowledged the dangers of human-induced climate change but planned to take steps towards adaptation and mitigation. The Kyoto Protocol essentially stated that 37 industrialized nations would reduce emissions by an average of 5% against 1990 emissions levels over a five-year period between 2008-2012.[73] While this may have seemed like a positive step towards building a resilient global community, some of the world's biggest

[73] "Kyoto Protocol to the United Nations Framework Convention on Climate Change", 1997.

polluters failed to sign the treaty, therefore ensuring they could uphold their growing economies and continue their polluting practices. Further, the Kyoto Protocol held fundamental design flaws, most notably the short time frame meant that both "domestically and internationally, [countries] could claim to be leading the charge on climate change without having to make massive changes to policy or spending that might have stirred up domestic concern over other countries free-riding on their efforts".[74] Ultimately, the Kyoto Protocol is widely seen as a failure among international systems[75] for its inability to deliver on adaptation strategies, and its continued resistance to climate science. There was a clear disregard of the risk assessment agreed upon within the protocol, and countries chose to prioritize the values and culture of their nation over the survivability of that society.

The Paris Climate Agreement held similar weaknesses as the Kyoto Protocol as its pledges and targets were seen as inefficient in meeting the desired goal of keeping temperatures at a maximum 2C rise. The main problem is that the PCA was designed to be the first of *many* steps taken to enact legitimate adaptation and mitigation strategies towards combating climate change.[76] But over the years, countries have proven that they do not intend to move beyond these first steps, ensuring that the agreements signed in 2015 were not nearly as ambitious to keep global temperature rise below 2C. Further, even if countries were to follow through with their intended commitments stated in the PCA, global temperatures would still rise by 2.1C by 2100,[77] creating irreversible damages to human and ecosystem health. The Climate Action Tracker[78] found that under current policies and processes, we would see a rise in 2.7C, and if we

[74] Rosen, 2015, 41.
[75] Rosen, 2015, 43.
[76] Maizland and Hill, 2021
[77] Climate Action Tracker, 2021
[78] Climate Action Tracker, 2021.

implemented the adaptive and mitigation strategies outlined in the PCA's 2030 plan,[79] there would still be a rise of 2.4C, both well beyond the threshold put in place by the IPCC. For the PCA to work, countries would need to be legally bound to their promises and focus on producing more ambitious plans every 5 years in order to stay within a 2C rise.

The Kyoto Protocol, Paris Climate Agreement, and COP 26 highlight the key weaknesses of international systems when adapting to climate change, mainly that without a system of accountability, nation-states will regress from their intended adaptive strategies and implement resistant policy and action. Without legally binding contracts and systems of punishment for those who do not follow through with their climate promises, nation-states can do whatever they please and IGOs have no means of holding them truly accountable. In the face of such an inevitable threat, it is vital that policymakers understand the gravity of our situation and see that inaction is just as powerful as action. In the words of Donald Rumsfeld, "there are no knowns. There are things that we know that we know. There are known unknowns. That is to say, there are things that we now know we don't know. But there are also unknown unknowns- things we don't know we don't know.".[80] We know that we are in a climate crisis, and we know that there are unknown consequences to our lack of effective adaptation, but it is the unknown unknowns that I believe will shake humanity to its core and force adaptation to preserve the longevity of society.

As mentioned above, climate change adaptation policy has followed more of a multilateral process of application, whereas Covid-19 adaptations favored unilateral, domestic responses. As the virus spread from country to country, nation-states shut down sporadically depending on the severity of the virus within their boundaries. The first to implement drastic

[79] "The Paris Agreement", 2021
[80] Rumsfeld, 2002.

measures was China, implementing strict quarantine rules in early 2020 and shutting down much of its economy.[81] Many countries followed, fist placing travel bans over various countries with high case counts and many shutting down their own borders in the hopes to prevent further transnational spread.[82] Over the past two years nations have responded uniquely to this international environmental crisis, many choosing to adopt new societal structures, sacrificing culture and place, and redefining national ethics and values. Other governing bodies resisted long-term adaptation and preferred to continue living in a pre-pandemic fashion, downplaying the risks of the virus and ignoring the factual knowledge on the dangers of Covid-19. This unilateral method of adapting lead to the complete restructuring of many societies and a lack of cooperation between nations. While IGOs such as the World Health Organization (WHO) released scientific data on the dangers of the virus and the ways in which humans can protect themselves from it,[83] many societies preferred to continue life with some sense of normalcy, putting themselves and members of their community at risk.

Chapter 4: Unequal Adaptations and the Environmental Injustice of Adapting

When the effects of environmental crises hit the globe, those effects are rarely felt equally among nations. More often than not, countries that are affected the most have contributed the least to environmental destruction, however, their adaptations will be of a greater scale as they are on the front lines of the crisis. This ongoing issue presents humanity with a multitude of environmental injustices as countries and regions face unequal adaptations in the face of catastrophe. This chapter discusses the environmental injustices of climate change and Covid-19

[81] Council on Foreign Relations, 2022.
[82] Council on Foreign Relations, 2022.
[83] World Health Organization, 2022.

and subsequently advocates for international cooperation in times of global strain as countries will be forced to adapt regionally and sporadically with the absence of responsible and equitable international systems. Further, this chapter will touch on specific cases of unequal adaptations, comparing the adaptive strategies and privileges of more developed countries (MDCs) versus those of less developed countries (LDCs).

Climate Change (In)Justice. It is a widely accepted ideology that disadvantaged groups are more susceptible to adverse effects of environmental crisis and degradation. The unequal distribution of advantages is an example of global environmental injustice that will disproportionately affect regions based on their political and economic power. The term environmental justice refers to the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies".[84] Within the context of climate change and Covid-19, environmental justice becomes an exceedingly popular topic as the unimaginable effects of these crises become a reality in vulnerable communities. Environmental injustice in these contexts therefore becomes an issue of human rights as the effects of Covid-19 and climate change become a series of chronic injustices and corrode the Universal Declaration of Human Rights.[85]

[84] EPA (Environmental Protection Agency), 2021.
[85] Robinson, 2019, 8.

In the context of the climate crisis, there has been ongoing development of a cycle of inequality, one that promotes the unequal distribution of adverse effects of climate change and the consequential adaptive strategies of disadvantaged countries. This cycle, as exhibited in figure 6 "shows that the relationship between climate change and social inequality is characterized by a vicious cycle, whereby initial inequality makes disadvantaged groups suffer disproportionately from the adverse effects of climate change, resulting in greater subsequent inequality".[86] Meaning, the more disadvantaged a group or region is at the onset of climate change will suffer more devastating consequences due to their lack of economic (resources) and political (state influence) power in comparison to less vulnerable communities.

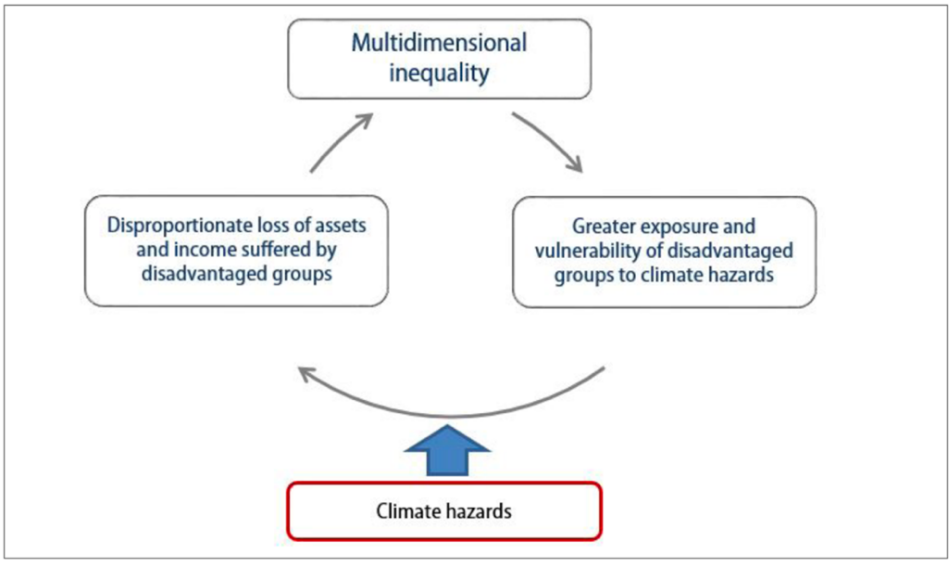

Figure 6. Inequality and climate change vicious cycle, Islam, Nazrul, and Winkel, 2017.

The United Nations Department of Economic and Social Affairs describes that this cycle can be understood in three instances of inequality:

> First, inequality increases the exposure of the disadvantaged social groups to the "adverse effects of climate change" ("climate hazards," for short). Second, given the exposure level, inequality increases the disadvantaged groups' susceptibility to damages caused by climate hazards. Third, inequality decreases these groups' relative ability to cope with and recover from the damages they suffer".[87]

[86] Islam, Nazrul, and Winkel, 2017.
[87] Islam, Nazrul, and Winkel, 2017, 15.

The remainder of this section will be dedicated to breaking down those three instances of inequality and contextualizing them within the framework of adaptation, arguing that a reliance on regional adaptation will result in the further promotion of climate injustice.

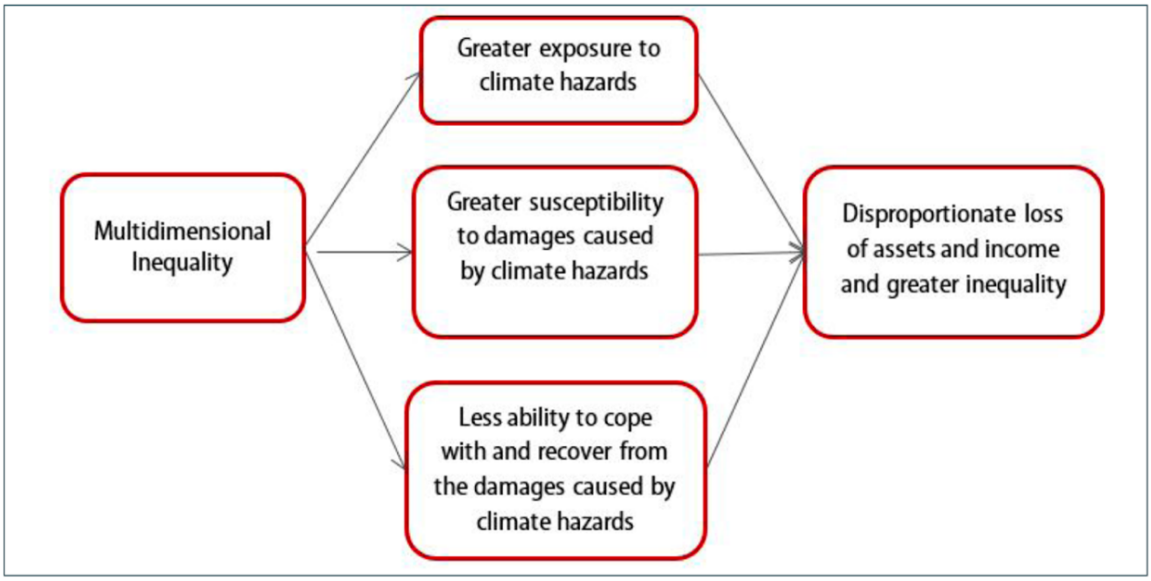

Figure 7. Three effects of inequality on disadvantaged groups, Islam Nazrul and Winkel, 2017.

Exposure. The exposure of a group tends to mean the location and physical nature of the affected peoples. Those who are more vulnerable to the effects of climate change tend to congregate in areas of increased risk, mainly rural areas that are susceptible to floods, drought, rising sea levels, erosion, heatwaves, and increased salinity. Recent studies show that "a significant part of the population in developing regions now live in "low-elevation coastal zone" and 100-year flood plains, and their number is increasing in both absolute terms and as proportion of the population".[88] Further, there is a larger concentration of disadvantaged groups, such as pastoralists and ethnic minorities, that are living in arid, semi-arid, and dry sub-humid aridity zones, who have a higher probability of experiencing water and food scarcity and adverse

[88] Islam, Nazrul, and Winkel, 2017 14.

health effects due to a warming climate.[89] Those living in these zones experience an unequal exposure to environmental threats and must therefore adapt quicker and to a higher degree than their more secure counterparts. Further, the absence of secure political systems and restricted access to resources places limitations on both mitigation and adaptive strategies of these regions. As a result, these societies may rely on more developed countries for support, again reducing their adaptive potential and contributing to the environmental injustice.

Susceptibility. The difference in susceptibility between advantaged and disadvantaged groups primarily stems from a group's economic and social position, both domestically and in the international community. Typically, a group becomes more susceptible to the adverse effects of climate change if they are unable to diversify their assets, they cannot afford to move out of a high-risk zone, they experience gender-based or racial violence, or they cannot adapt to a changing market.[90] It is not uncommon for disadvantaged communities to have their savings in vulnerable housing stock (urban communities) or livestock (rural communities), which are both susceptible to environmental disasters such as flooding or drought[91], therefore placing their assets and livelihoods at a higher risk. The global wealthy on the other hand typically hold their assets in a more diverse fashion, thus increasing the security of their assets and ensuring that they are not at risk of losing them in the event of a climate crisis. The economic position of many groups also influences their ability to move out of high-risk areas and into more secure locations as they often cannot afford to leave. Their inability to leave again makes them more susceptible to both physical climate change damage (e.g. natural disasters) and negative health impacts. Oftentimes, "people living in poverty are more susceptible to the diseases that many climate

[89] Islam, Nazrul, and Winkel, 2017 15.
[90] Islam, Nazrul, and Winkel, 2017, 15.
[91] Islam, Nazrul, and Winkel, 2017, 15.

hazards help to spread, including malaria and water borne diseases".[92] Additionally, those who experience gender and racial violence are more susceptible to the adverse effects of climate change. Studies have shown that women are more likely to be vulnerable to the impacts of climate change than men and it is not uncommon for climate change to create poverty traps in various regions, further ensnaring women in undesirable locations.[93] Race plays a key role in susceptibility as the IPCC found that there is significant importance on the role "of social positions of different groups in determining the impact of climate change",[94] typically due to the entanglement of economic prosperity and racial or ethnic identity. It is often those of racial or ethnic minorities, such as indigenous communities, that must adapt quicker to the effects of climate change as they are on the front lines of the crisis and are therefore forced to bear the burden of worsening conditions first. Finally, the economic prosperity, or lack thereof, of a specific group can determine their susceptibility due to their adaptability to a changing market. As the effects of climate change transform the market value of goods and resources, particularly that of nutritious foods, lower-income communities may not be able to afford to feed their families and therefore suffer food scarcity.[95] Vulnerable communities are compounded with many, in some cases all, of these biases and systems of injustice which consequently increases their climate insecurity and prohibits them from adapting effectively.

Ability to cope and recover. How a country or region copes with and recovers from an environmental crisis is the third pillar of inequality as this ability is ultimately determined by their access to resources. Those resources include insurance, common property and social

[92] Islam, Nazrul, and Winkel, 2017, 15.
[93] Islam, Nazrul, and Winkel, 2017, 16.
[94] IPCC, 2014.
[95] Islam, Nazrul, and Winkel, 2017, 17.

resources, and public resources.[96] Access to insurance is possibly the most important because it safeguards the capital of both nations and individuals in the wake of environmental destruction. Disadvantaged groups, however, do not often have access to insurance and therefore cannot protect both physical and human capital,[97] resulting in the sacrifice of one or the other. Disadvantaged groups also tend to rely more heavily on access to common property (i.e. shared ecosystems that provide timber, sustenance, fresh water, and protection) or social resources.[98] If that property or good is damaged, they lose access to those ecosystem services and must adapt at a faster and more efficient rate than advantaged groups, thus negatively affecting their ability to cope and recover from environmental changes. Access to public resources is the other hindrance due to the unequal distribution of welfare functions after environmental destruction.[99] The main issue with the allocation and distribution of public resources stems from the discrimination against disadvantaged groups as they are less likely to receive aid from government systems in the wake of crises.[100] This discrimination can be attributed to race, class, or gender, but ultimately yields the same result of environmental injustice.

The Differences in Climate Adaptation Between LDCs and MDCs. The varying degrees of exposure, susceptibility, and ability to cope and recover have tremendous impacts on a country's capacity to adapt to climate change effectively. Traditionally, MDCs suffer far less exposure and susceptibility and possess strong enough institutions that promote coping mechanisms and recovery than their LDC counterparts. Yet, MDCs are the primary proponents of human-induced climate change and force LDCs to suffer the adverse effects first and to a

[96] Islam, Nazrul, and Winkel, 2017, 18.
[97] Clarke and Dercon. 2015.
[98] Barbier, 2010.
[99] Islam, Nazrul, and Winkel, 2017, 18.
[100] Islam, Nazrul, and Winkel, 2017, 19.

higher severity. As stated above, this is the key component of climate injustice, and researchers are already seeing the effects of unequal adaptations.

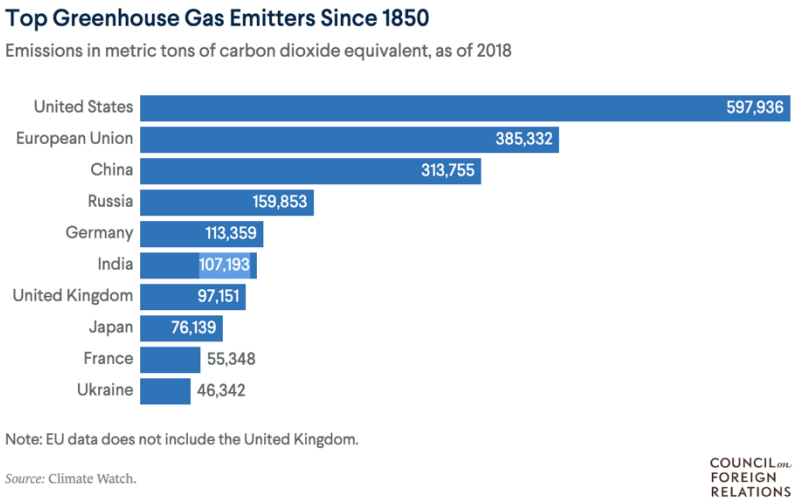

Figure 8. Top 10 greenhouse gas emitters since 1850, Maizland, Lindsay, and Hill. 2021.

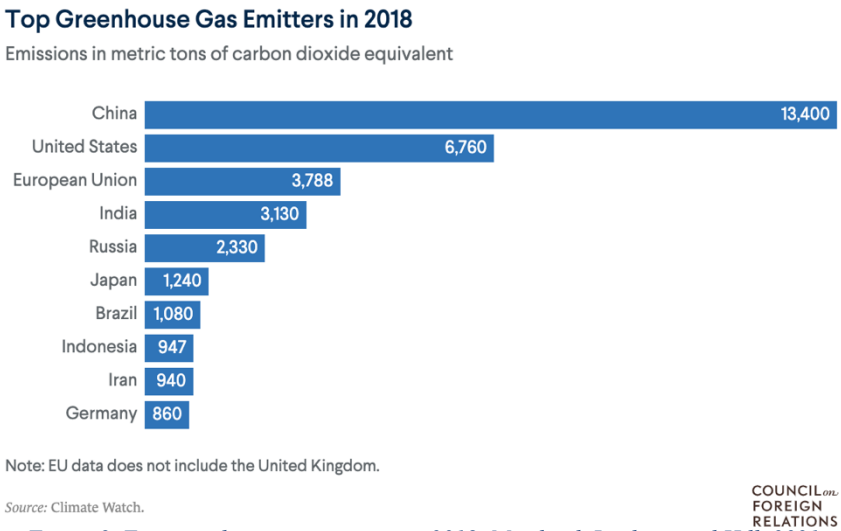

Figure 9. Top greenhouse gas emitters in 2018, Maizland, Lindsay, and Hill. 2021.

Climate Change Comparison. The disparity between polluting countries and non-polluting countries has been growing for quite some time. Even since 1992 the United Nations Framework Convention on Climate Change (UNFCCC) declared that there were "common but

differentiated responsibilities"[101] when considering the effects of global pollution and recognized that advantaged countries tended to be higher polluters with the added privilege of avoiding the most dangerous consequences. This disproportionate allocation of responsibility created the "free rider" versus "forced rider" problem, wherein "'free rider' countries contribute disproportionately to global GHG emissions with only limited vulnerability to the effects of the resulting climate change, while 'forced rider' countries are most vulnerable to climate change but have contributed little to its genesis".[102] This means that countries like China and the United States have become the winners of the climate crisis as they have the ability to promote their fossil fuel industries with little perceived impact to their day-to-day lives, whereas many other island and African nations must suffer more severe climate impacts.[103] As a result of this issue, MDCs have done little to contribute to global climate adaptations and have continued to follow methods of resistance which have produced underwhelming results. In a comprehensive review of the effectiveness of MDC climate adaptation, researchers found that while MDCs may produce adequate adaptation and mitigation policy, it does not necessarily translate into adaptation action. Thus, this inaction creates a "lack of political will to meaningfully address climate change impacts, particularly at local levels where a mismatch between national statements on adaptation and local action has been noted".[104]

LDCs, on the other hand, are having similar issues as they produce adequate climate adaptation strategies but are unable to deliver due to preexisting conditions of global economic inequality and political instability. LDCs tend to be more vulnerable, due to higher levels of exposure and susceptibility, and are less prepared for climate change damages as a result of their

[101] UNFCCC, 1992.
[102] Althor, Watson, and Fuller, 2016.
[103] Althor, Watson, and Fuller, 2016.
[104] Berrang-Ford, Biesbroek, Ford, Lesnikowski, Tanabe, Wang, Chen, et al., 2019, 334.

inability to cope and recover. On the University of Notre Dame's Global Adaptation Index,[105] LDCs tend to rank low on the vulnerability and readiness scoresheets. Countries such as Niger (182:0.677, 131: 0.338), Liberia (177:0.605, 165: 0.280), and Haiti (152: 0.530, 182:0.238)[106] not only hold some of the poorest ranks, they are designated as low-income groups among the global community, making it far more difficult for them to apply their adaptive strategies due to their weak economies. That is not to say that LDCs are not trying to implement and practice adaptive policy despite these setbacks. There is a growing trend among LDCs to generate climate policy that focuses on protecting agriculture sectors, preserving freshwater systems, and fortifying healthcare systems through national development strategies.[107] And while there is progress being made, these countries would benefit from the reassessment of international systems and treaties as well as increased accountability among MDCs. This is the greatest disparity within the climate change conflict; on the one hand are MDCs, able but unwilling to adapt and continuing methods of resistance, and on the other LDCs unable but willing to adapt effectively and efficiently. Remedies to this problem will be further explored in Chapter 5, but first a look at the environmental injustices of Covid-19.

Covid-19 Injustice. In April 2020, I recall someone had called the pandemic "the great equalizer", the first global crisis of my generation that would affect each and every person on the planet in equal measure, because at that time, no one believed you could run from the virus. For weeks I believed this statement as I watched community after community succumb to the virus, wealthy and poor, old and young, urban and rural. There seemed to be a trend that MDCs were

[105] University of Notre Dame, 2019.
[106] University of Notre Dame, 2019.
[107] Parry and Terton, 2016.

suffering higher losses, both of life and economic prosperity, while LDCs had lower case levels and mortality rates.[108] Yet, as the weeks stretched into months, and now into over two years, it has become clear that Covid-19 may have temporarily equalized the globe, but it eventually exacerbated preexisting global inequality and once again placed LDCs at social, political, and economic disadvantages.

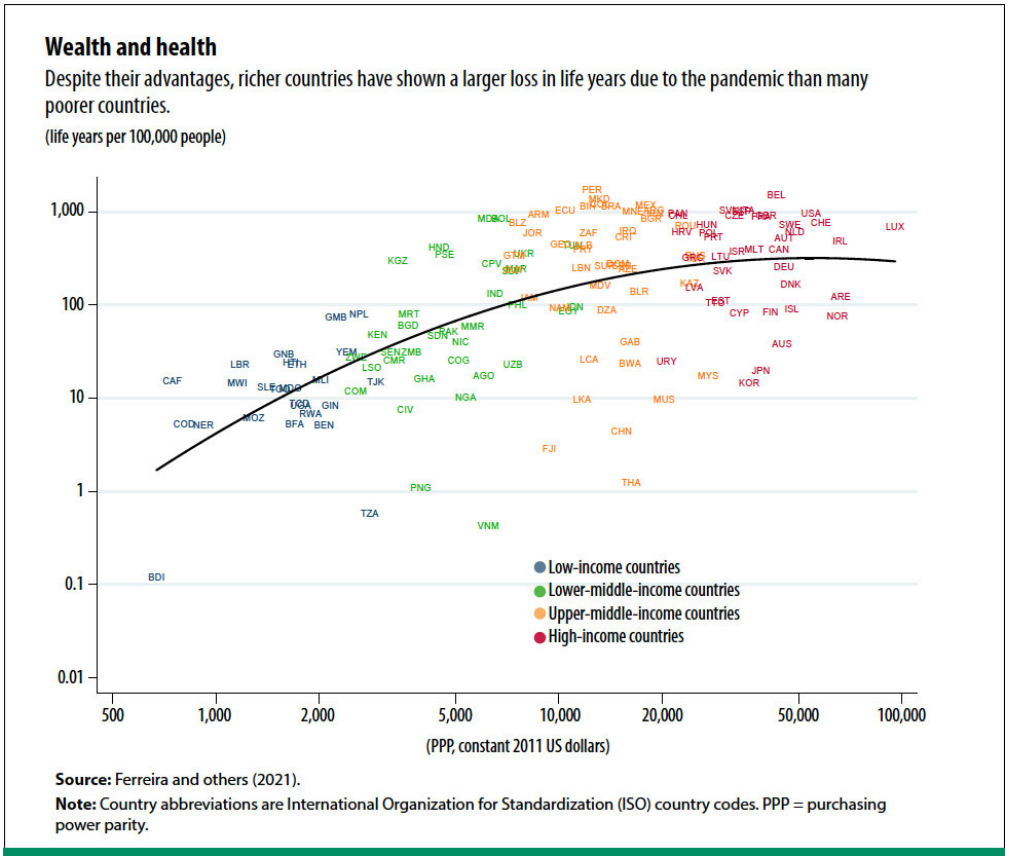

Figure 10. Measurement of loss of life in the context of GDP, Ferreira, 2021.

Similar to the injustices of climate change, the inequalities of the pandemic are a result of LDC's disadvantages in their ability to cope and recover, susceptibility, and exposure to the virus. After the initial hits of the virus passed, it became increasingly clear that the pandemic exposed the cracks in global inequality as LDCs were less equipped to implement virus

[108] Ferreira, 2021.

mitigation and adaptive strategies due to their vulnerable health systems, lack of access to resources that could promote economic recovery, and unstable or weaker political systems that were unable to keep up with, or even participate in, the race for a vaccine.[109] While MDCs began to reopen their economies and implement widespread vaccine efforts, LDCs continued to live under threat of the virus and economic collapse. Further, MDCs were able to implement widespread socio-cultural adaptations such as moving education and labor to the virtual world, allowing the continuation of childhood development and economic stability. LDCs on the other had did not have adequate access to remote equipment and were either forced to stay home, diminishing cognitive development in children and young people, or expose themselves to the virus.[110] Gender inequalities were also heavily exacerbated as women stayed home as full-time caregivers for family members, removing them from education and economic opportunities and furthering the gap for gender equality. Finally, MDCs profited from economic adaptive strategies as many key world banks loosened monetary policy and injected enormous amounts of liquidity into financial markets.[111] That additional liquidity helped keep assets high and ultimately, inflated the value of assets held primarily by rich people and had a lot to do with the generalized growth of billionaire incomes.[112] All this to say, there are overarching themes in the globalized inequality of environmental crises, and unless MDCs are held accountable and assist in LDC aid and recovery, it is unlikely that the gap in efficient adaptation will close.

Chapter 5: Policy Recommendations

[109]Stiglitz, 2021, 17-19.
[110]Ferreira, 2021.
[111]Ferreira, 2021.
[112]Ferreira, 2021.

This paper has illustrated that humanity not only has the destructive capacity and capabilities of nature, but that humanity is unprepared to adapt to the consequences of human action and is therefore ill-equipped for the tumultuous times to come. The dramatic effects of Covid-19 and the growing effects of climate change prove that the international society is unprepared for human-induced environmental crises and lacks the adaptive capability to survive and thrive in changing ecosystems that are rocked by climate change and global pandemics. The importance of understanding these threats and our subsequent preparedness for these consequences has never been more pressing as we enter a tipping point in human history.

The adaptive strategies mentioned throughout this paper have highlighted some of the key strengths and weaknesses of current adaptation policy and practice. Before I give my recommendations on how humans can best adapt to climate change and Covid-19, I would first like to point out those strategies I agree with. First and foremost, I am extremely impressed and pleased with the amount of scientific research and literature I encountered during my findings, primarily from those IGOs mentioned in Chapter 3. The reports from the IPCC Working Groups are, I believe, especially useful in drafting effective policy and accurately placing responsibility on international actors. International agreements such as the Paris Climate Agreement and Kyoto Protocol, though lacking in application, are an excellent start to promoting an international adaptive strategy to human-induced climate change and are nothing if not a framework for more productive policy.

Recommendations: Climate Change

Wartime Mobilization. As stated in previous chapters, I do not find current adaptive strategies to climate change efficient as many continue to resist the dangers of this growing crisis and produce unjust results. The way I see it, there are two broad scenarios in which humanity

could adapt efficiently and preserve enough of society to make civilization recognizable when the large-scale consequences of climate change begin to take place. The first scenario is one of rapid climate mitigation and the adoption of severe policies intended to minimize the impacts of climate change. If countries were to immediately implement the strategies outlined in the Paris Climate Agreement and those agreed upon during COP 26, then we may have a fighting chance at keeping global temperatures below 2C. But to protect the majority of society and repair the damages of existing impacts, governments must take stronger action in climate change mitigation. One way of enacting such policy would be to approach climate change mitigation in the same manner and capacity as governments approach war-time strategy. Climate change is already becoming a national security issue,[113] but what would happen if governments reacted to changing temperatures as if they were waging a war on the very extractive systems that caused this disaster? A method of wartime mobilization would have to occur if this scenario were to become a reality. We saw hints of this mobilization during peak pandemic times, and I foresee it happening if countries do not react to climate change in a swift, multilateral fashion.

Wartime mobilization is the practice of assembling massive amounts of resources and deploying them in reaction to national security threats.[114] Similar to the type of mobilization seen during the World Wars, governments would have to treat climate change as a threat to international security and restructure political, economic, and social systems. A restructuring of political systems would give more power to international institutions in holding nation-states accountable for their actions, or lack thereof, in climate mitigation. Thus, a power shift would take place wherein IGOs would hold more power than nation-states and foster a broader, more inclusive international community. Traditional economic sectors would also take a hit as the

[113] "DOD Climate Risk Analysis", 2021.
[114] Delina and Diesendorf, 2013.

current international capitalist systems are far too extractive and promote the welfare of MDCs over LDCs. Opportunities for restructuring include a focus on investing resources back into the land that was used for over extractive purposes such as pastures and clear-cut farms.[115] By putting money back into the reestablishment of habitats, ecosystems have a greater chance at recovery and could serve as eventual protections against climate change impacts. Finally, restructuring social systems such as consumer-based societies or even promoting different eating habits among MDCs could have tremendous impacts on the mitigation of climate change. By reducing output of goods and services and forcing minimized consumption, societies would engage in less extractive and polluting industries. Further, altering eating habits, such as consuming less animal products (when they are not necessary for nutrition), would greatly reduce GHG emissions and open up land for more sustainable activities. And while I understand that these dramatic changes are ideals that many are familiar with, it is the process of application that would require such a dramatic shift.

Using wartime mobilization strategies may be the most efficient, and ultimately, the only way to implement mitigation policy before it becomes impossible to stop the most destructive effects of climate change. Though, if this scenario is to be the most efficient it can be, mobilization cannot be limited in a purely unilateral sense, rather, nation-states must work together and utilize IGOs, NGOs, and multinational corporations to implement mitigation strategies. If nation-states were to give more powers or resources to IGOs such as the UN Security Council, those IGOs, with help from NGOs and multinational corporations, could enact mitigation strategies across borders, breaking the traditional transnational boundaries and creating a global community with more centralized power structures. Those power structures, in

[115] Malm, 2020.

turn, can ensure that LDCs are given equal representation and require that responsible MDCs contribute higher volumes of resources, human capital, and market influence in order to protect the livelihoods of LDC communities as they would their own.

Accepting the Danger. The second strategy is one that is perhaps a bit more morbid, but one I believe to be more likely. This scenario is dependent on the idea that society must accept that we are, and will continue to be, living through catastrophic changes we are unable to stop. This entails accepting that our day to day lives will become dangerous and that our actions will be in a constant battle with the unprecedented dangers we are facing. That is not to say that societies should welcome danger, rather it means that we should no longer resist climate danger as part of our lives and work towards building a resilient global community.[116] To build a resilient society, there would usually be adequate mitigation strategies, but in the absence of those strategies, resilience would be entirely dependent on how prepared societies are for known dangers and how capable they are at adapting to unknown dangers on the fly. This scenario would require a certain kind of understanding as humanity would accept that daily life would have to be upended at some point with no guarantee that normalcy would resume. As explained in Chapter 2, humans would have to become cognizant of this evolutionary choice: choosing to accept danger and pursue the preservation of culture and space over the survivability of the broader international community. The adaptive strategies necessary in this scenario would then require a mix of preparedness and reactionary strategies, such as fortifying infrastructure against increased flooding or quickly implementing migration transportation for displaced communities.

I say that this scenario is more morbid than the previous scenario because part of accepting the dangers of climate change entails that we must also accept the losses that come

[116] Evans and Reid. 2013.

with a catastrophe of this scale. The international community must be prepared to lose untold numbers of communities, cultures, and our very way of life if we continue our resistance to climate change. And though this scenario accepts those losses, it is vital that it does not prioritize the losses of one community or culture over the other. Similar to the wartime mobilization strategy, there would have to be a reallocation of resources in order to ensure there are equal chances of survivability between MDCs and LDCs. This, again, would require that IGOs have a higher degree of influence and power than is typically awarded to them, thus establishing more equal structures of international governance.

Recommendations: Covid-19

The persistent lifeforce of the pandemic has allowed countries and the global society to adapt in a variety of forms and functions, changing strategies based on the emergence of new shared knowledge, the overall ethics and values of a nation or it's governing body, the preservation of culture, and the perceived risk of the virus. Over the past two years mitigation and adaptive strategies have changed dramatically, from extreme lockdowns to vaccine mandates and economic relief packages. To recommend policy adaptations towards our continued interactions with this virus, these policies would have to be split between reactionary adaptive methods and mitigation of future pandemics, though the two together would create an overall resilient adaptation plan, promoting the survivability of the international community.

Reallocating Resources. The biggest failure of Covid-19 adaptations was our inability to prioritize equity on an international scale, for many vulnerable communities were left behind in the reactionary adaptive strategies. As discussed in Chapter 3, LDCs were and still are at a higher risk of bearing the unequal burdens of Covid-19 due to their increased susceptibility, exposure, and inability to cope and recover. And while many have learned how to handle the higher rates

of susceptibility and exposure, several LDCs remain at a disadvantage to adequately cope with and recover from the pandemic than MDCs. Therefore, current adaptive strategies must prioritize aiding in the recovery of LDCs, both on socio-cultural and economic levels. Just as climate change adaptation policy should give more power and influence to IGOs, Covid-19 strategies should reallocate global resources and power to organizations that can ensure an equitable recovery among LDCs and MDCs. Meaning, IGOs and NGOs are given increased political and economic influence and have the ability to redirect recovery strategies from non-essential MDC plans, towards necessary LDC aid.

Preventing Future Spillover. When SARS COV-2 jumped from bats to human hosts, humanity experienced what is known as a "spillover", or the transmission of diseases from wildlife to human populations. The key aspect to preventing and mitigating future pandemics is to prevent future spillovers, meaning humans must dramatically modify their interactions with wildlife and the environment to protect both human hosts and ecosystem health. There are four key policy recommendations to prevent spillover; rolling back on deforestation, limiting international and domestic wildlife trade, reassessing animal agriculture ethics and practices, and funding disease detection and control organizations.

About one-third of the world's forests have been lost due to deforestation. This devastating loss of habitable land has increased the interaction between humans and wild animals as they are forced out of their natural habitats and assimilate to anthropocentric ecosystems. This, therefore, increases the interaction between humans and wildlife, broadening the transmission capacity of zoonotic viruses. Studies have shown that humans and livestock are more likely to "contact wildlife when more than 25% of the original forest cover is lost, and such contacts

determine the risk of disease transmission.[117] This rise in contact consequently leads to a rise in transmission and a higher risk of pandemics. A shift towards smaller scale farming or a reduction in the consumption of livestock could have dramatic effects on the probability of another spillover. Therefore, policy that mirrors the wartime mobilization strategy above could dramatically reduce the amount of land used for agriculture and limit human and livestock exposure to wildlife. Further, while a loss in biodiversity may seem to limit the reservoir host pool and decrease transmission capacity, the increase in the human transmission pool consequently leads to a higher magnitude of any resultant outbreak and decreases the destructive capacity of the virus.[118] An international push to halt or limit deforestation tactics would in turn protect human populations that live in close proximity to forest regions and decrease the likelihood of future global outbreaks.

Deforestation is not the only destructive human method that heightens the interactions between society and wildlife. The market of wild animal trade is another major contributor to the risks of pandemics, one that the world is entirely too familiar with. The trade of wild animals is used for both recreational and nutritional purposes, however, there is clear exploitation of these practices that can have devastating results. Imposing strict bans or restrictions on the domestic and international trade of wild animals, limiting wildlife markets, or providing zoonotic virus screenings of wild animals can have transformative effects on human-environment interactions. Though to ensure the equity of these measures, cultural reliance on wildlife nutrition must be

[117] Dobson, Andrew P., Stuart L. Pimm, Lee Hannah, Les Kaufman, Jorge A. Ahumada, Amy W. Ando, Aaron Bernstein, et al. "Ecology and Economics for Pandemic Prevention." *Science* 369, no. 6502 (2020): 379.
[118] Dobson, Pimm, Hannah, Kaufman, Ahumada, Ando, Bernstein, et al. "Ecology and Economics for Pandemic Prevention," 379.

taken into account when drafting legislation as many indigenous communities rely on bushmeat for daily nutrition.[119]

The implementation of these preventative measures would have exponentially positive effects on human-environmental relations, but they would be even more effective if nations and institutions prioritized funding for early detection and control of zoonotic viruses. There are existing programs worldwide that are dedicated to the detection and prevention of transmittable diseases among wildlife populations, however, there is a severe lack of funding among these sectors. A post-Covid world will likely see an increase in the funding for these projects as humans begin to understand the implications of human-wildlife interactions. The prioritization of "detection and control programs targeting outbreaks in their early stages would result in considerable savings by reducing morbidity and mortality".[120] Further, the benefits of using these programs would highly outweigh the benefits as the costs of pandemic reactionary adaptations are exponentially higher than the costs of preparedness.

Conclusions

There is no one way to adapt to human-induced environmental crises. Decades of interactions with the environment have dramatically altered both the conditions under which we now must adapt and the processes in which we adapt to those conditions. The human adjustment of socio-cultural adaptions is so varied across the geopolitical landscape that it can be difficult to implement effective adaptive policy and even more challenging to ensure that policy is equitable and accountable. However, if we are to reevaluate these systems of adaptation and distance ourselves from the modes of resistance that have engrained themselves in adaptive strategy, we

[119] Dobson, Pimm, Hannah, Kaufman, Ahumada, Ando, Bernstein, et al. "Ecology and Economics for Pandemic Prevention," 380.
[120] Dobson, Pimm, Hannah, Kaufman, Ahumada, Ando, Bernstein, et al. "Ecology and Economics for Pandemic Prevention," 381.

have a fighting chance in transforming the international society into one that embodies resilience and equality. International systems must be robust in these changes, but if they are to comply with the adaptive strategies they have already created and push for greater responsibility and ambition, then we too can envision adaptations fit for the age of humans.

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