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Surviving Future Pandemics: The Economic, Social, and Political Battle Against Climate Change and Infectious Diseases

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Abstract

COVID-19 has been a rude wake-up call as it showed us how unprepared we are to fight off infectious diseases. This paper analyzes our political, social, and economic decisions to develop a plan against the future development of infectious diseases. Before the analysis, it is essential to understand that it is natural for infectious diseases to develop and spread; however, climate change has and will continue to exacerbate the number of diseases developed and spread. Chapter 1 provides data on how climate change has destroyed habitats and displaced millions of animals, forcing them to live under cramped conditions that have the potential to produce and spread new infectious diseases. Chapter 2 starts with the economic and social consequences of infectious diseases by drawing examples from COVID-19 and other diseases. In the presence of a threatening disease, there is a shift in the way we make decisions on a structural and individual level. However, some people are limited in the choices they can make. Chapter 3 dives deeper into the environmental injustice and the structural inequalities that affect marginalized people and place them at a disadvantage compared to their counterparts. Rich people have better medical facilities and get faster access to preventative measures, whereas poor people of color lack access to health care and often have received low-quality treatment. Chapter 4 focuses on how prepared the United States was in terms of policies and public health for COVID-19: what policies were set before, what new policies are being enforced, and how the public reacts. Wrapping up the paper, Chapter 5 explores what the United States should have done by analyzing what worked for them and other countries.

Keywords: Climate change, Infectious Diseases, COVID-19, Environmental Justice, Public Policy

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Introduction Case Study: Malaria

Malaria is a potentially fatal disease caused by a parasite that is transmitted to humans through the bite of an infected mosquito. The World Health Organization (WHO) estimates there were 229 million malaria cases worldwide and 409,000 deaths in 2019. Once bit by an infected female mosquito, the parasite travels through the blood to the liver, reproducing asexually before going back into the bloodstream. This process takes about two weeks, and during this time, patients have no symptoms. Symptoms of malaria can vary based on severity. Some patients report experiencing a high fever with chills, headache, aching limbs, nausea, and diarrhea are common symptoms.[1] In severe cases, patients experience "swollen liver, paleness, jaundice (yellowing of the skin and eyes), anemia, and respiratory distress."[2] The parasites require at least 68°F (20°C) to complete their life cycle successfully.[3] For this reason, malaria is an endemic disease primarily observed to occur in some tropical and subtropical regions, including areas of sub-Saharan Africa, Southeast Asia, the Western Pacific, and parts of South America. However, as climate change affects weather patterns, infectious diseases will remain a global threat.

Climate change has the potential to affect infectious diseases in ways we don't notice. Malaria is found in a range of habitats, but malaria infected mosquitoes are commonly found in clean unpolluted water. Some examples include puddles, streams and ponds, and wells.[4] Since mosquitoes populations prefer aquatic environments, they are affected by rainfall. Mosquitoes require stagnant water in which to breed. Thus, an increase in rainfall means there is an increase in the mosquito population. Scientists have reported that the sea level has been increasing over the

[1] Aldridge, Susan, and Claire Skinner. 2018. "Malaria." In *Infectious Diseases*, 2nd ed., edited by Thomas Riggs, 580.
[2] Ibid., 580.
[3] Ibid., 580.
[4] Williams, Jacob, and Joao Pinto. 2012. “Training Manual on Malaria Entomology.” 14.

past few decades, and rainfall has increased in some parts of the world. This means that climate change can potentially bring malaria-infected mosquitoes into countries that have never had it before. Additionally, the parasite requires 68°F (20°C) to complete its life cycle. Climate change is predicted to cause warmer weather plus hotter and more frequent heatwaves. As a result, studies have predicted that the mosquito that carries malaria will spread into colder regions, thus allowing mosquitoes to transmit the disease in previously unaffected areas.[5] Fortunately, malaria's symptoms are treatable and preventable. However, the inequalities between countries will continue to lead to the preventable deaths of millions each year.

Malaria exposes the global inequalities that will continue to affect marginalized communities and potentially lead to their deaths. Malaria research is critically underfunded, causing this disease to continue affecting African communities. According to Aldridge and Skinner, malaria research was supposed to have an "investment of US$ 6.5 billion … required annually by 2020 in order to meet the 2030 targets of the WHO global malaria strategy. [However] the US$2.7 billion invested in 2016 represents less than half of that amount."[6] Since malaria doesn't affect first-world countries as harshly as third-world countries, it is not a major global focus. First-world countries are the ones with enough wealth and power to help third-world countries from having to suffer economically, socially, and politically from malaria-related problems, yet they choose to prioritize other issues over vulnerable people's lives.

Malaria is one of the many examples that reveal how diseases affect us economically, socially, and politically. This disease causes many direct and indirect economic costs. First, the financial burden that African countries experience because of lost productivity caused by sick

[5] Gilman, Larry, and Claire Skinner. 2018. "Climate Change and Infectious Disease." In *Infectious Diseases*, 2nd ed., edited by Thomas Riggs, 206.
[6] Aldridge, Susan, and Claire Skinner. 2018. "Malaria." 583.

workers. Not only is the nation losing money, but families are losing sources of income, forcing them to sell assets or withdraw children from school to replace sick workers. Families also spend up to "one-quarter of a household's monthly income" to pay for medical expenses.[7] Other direct household costs include expenditure on prevention, including mosquito coils, aerosol sprays, bed nets, and mosquito repellents.[8] Malaria keeps families and nations in poverty. Socially, malaria changes the way people make their life choices. For example, people and their education. Some must choose between school or having an extra source of income, dealing with the loss or treatment of loved ones or children affected by malaria. Politics are another added layer that affects how malaria is experienced.

African politics have a gigantic influence on how diseases are experienced economically and socially. African leaders can determine the funding that goes into stopping malaria, the resources provided to their citizens, and their partnership with other countries. Further, there needs to be help from other countries or global organizations to see results. An example of this is the Booster Program for malaria control in Africa. The World Bank noticed its previous failed attempt at controlling malaria because they solely focused on strengthening health systems. African governments worked with the World Bank to correctly allocate funds in the Booster Program. Phase 1 of the Booster Program was successful because African governments voiced their needs to the World Bank. The way African leaders choose to approach malaria will virtually determine the trajectory of the disease.

Malaria is a small representation of what can happen on a global scale. As anthropogenic sources continue to change our environment and climate, there is an increased chance of infectious

[7] *Intensifying the Fight against Malaria*: *The World Bank's Booster Program for Malaria Control in Africa*. 2009.
[8] Chima, Reginald Ikechukwu, Catherine A. Goodman, and Anne Mills. 2003. "The economic impact of malaria in Africa: a critical review of the evidence." 18

diseases developing and spreading. This paper will discuss how infectious diseases will affect everyday life and how we can learn from our mistakes to better prepare for future disease outbreaks. Chapter 1 provides quantitative data on the causes and consequences of climate change. Using the United Nations "Millennium Ecosystem Assessment" and the "Climate Change 2014 Synthesis Report Summary for Policymakers Chapter," I will report the concerning changes in our climate and how this relates to the increased development of diseases. Chapter 2 dives into the most noticeably affected by infectious diseases, the economy and social life. Using the COVID-19 pandemic as a guide, I examine how the governments and citizens' approaches negatively affected the economy and everyday life. Chapter 3 discusses the environmental injustices during a disease outbreak or pandemic. There is a difference in how poor people of color and rich people experience infectious diseases because of their access to beneficial resources. Chapter 4 explores how the United States government approached COVID-19 and past infectious diseases. There have been several guides created by reputable organizations like the World Health Organization to help people in power manage infectious diseases; however, this chapter shows us how, despite the recommendations, the government makes the final decision. Chapter 5 uses what the previous chapter discusses and attempts to give recommendations on how we can learn to approach infectious diseases.

Chapter 1. Development of Infectious Diseases

To understand how infectious diseases relate to current and future economic, social, environmental justice, and political struggles, we must first address the environmental issues that come before. The Millennium Ecosystem Assessment is a publication that evaluates human interaction with the natural environment. The assessment, which took place between 2001 and

2005, covers a wide range of topics primarily focusing on linkages between ecosystems and human well-being to ultimately establish "the scientific bases for actions needed to enhance the conservation and sustainable use of ecosystems and their contributions to human well-being."[9] By focusing on different ecosystems, the assessment shows how humans have destroyed the environment and how this has caused global problems, especially for disadvantaged or underdeveloped areas.

There tends to be confusion between weather and climate, which are two distinct things. Weather is the condition of the atmosphere at a specific time in a specific place, including temperature, cloudiness, humidity, precipitation, and winds. On the other hand, the climate is long-term average weather that describes an area. An example would be tropical climates in areas closer to the equator. The Earth experiences climate variability, which refers to variations in the average state of the climate beyond that of individual weather events. Climate variability happens naturally and periodic changes in the circulation of the air and ocean, volcanic eruptions, and other factors. However, climate change is causing an increase in the probability of many extreme weather events, and those events contribute to climate variability. Climate change has caused changes in average weather conditions on Earth and the frequency of severe weather events like floods, storms, heatwaves, etc. As a result of human greed, climate change has been advancing at a rate humans can't fully control, resulting in detrimental consequences.

Though climate change is a naturally occurring process that takes hundreds of thousands to millions of years, the rate at which it is ensuing now is cause for major concern. Human interaction with the environment is usually based on what it can provide for us. We call this "natural capital," which includes the resources and services that the Earth naturally produces to

[9] *Ecosystems and Human Well-Being: Synthesis: A Report of the Millennium Ecosystem Assessment*. 2005. Washington, D.C: Island. V.

support all life and economy. Examples of natural capital include nutrient cycling, freshwater, habitat, temperature regulation, biodiversity, etc. We must protect Earth's natural capital because otherwise, the lives of animals and humans and our economies are at stake. Not only that, but humans can't always replace many of these processes provided by natural capital. If we continue to use these resources at a rate faster than they could be replenished, we risk losing them forever. Our focus on economic growth becomes unsustainable when it depletes or degrades various irreplaceable forms of natural capital.

Unfortunately, we don't protect natural capital because of our failure to assign a monetary value to the benefits it provides. It is difficult for economists to apply value to the ecosystem services provided by forests and oceans. Natural capital is calculated values at about "US$16–54 trillion, with an estimated average of US$33 trillion."[10] However, because this is just an estimate, major contributors to natural capital degradation continue to exploit and make their profits. Valuing natural capital is vital when it comes to avoiding future damages. We will notice the importance of natural capital when it stops benefiting us, and we have destroyed them past the point of no return. There are multiple ways humans have depleted natural capital and forced climate change. The anthropogenic causes have been greenhouse gas emissions, pollution, and changes in land use.

Greenhouse gases are a naturally occurring component of the atmosphere that helps keep the Earth a habitable planet. Solar radiation makes its way to the atmosphere, some is reflected, but some make it down to Earth's surface, where it gets absorbed or reflected again. The Earth's surface absorbs the solar radiation keeping it warm. Greenhouse gases play a role in warming the Earth by absorbing some infrared radiation and re-admitting it in all directions; this is called the

[10] Costanza et al. 1997 “The value of the world’s ecosystem services and natural capital.” 253.

greenhouse effect. The most common greenhouse gas is carbon dioxide (CO2). Other gases like Methane (CH4), nitrous oxide (N2O), chlorofluorocarbons (CFCs) have smaller concentrations but have a stronger warming effect due to their heat-trapping abilities and long residence time in the atmosphere. Human activity has increased the concentration of greenhouse gases, especially carbon dioxide, in the atmosphere. The combustion of fossil fuels for energy production is the main reason for increasing greenhouse gases. According to the Millennium Assessment, " Since 1750, the atmospheric concentration of carbon dioxide has increased by about 32% (from about 280 to 376 parts per million in 2003), primarily due to the combustion of fossil fuels and land use changes. Approximately 60% of that increase (60 parts per million) has taken place since 1959."[11] The increase of carbon dioxide has also led to ocean acidification since it dissolves in water to form carbonic acid. Methane concentrations have risen due to agricultural practices, and nitrous oxide has risen with automobile use. With more greenhouse gases in the atmosphere absorbing infrared radiation, the Earth has experienced global warming.

Pollutants released into the environment by anthropogenic sources contribute towards climate change while simultaneously affecting natural capital. Humans pollute the air, water, and land. The pollution humans have caused impacts on public health, crops, timber, corrosion, water acidification. Sulfate aerosols and black carbon are two air pollutants contributing to climate change. Sulfate aerosols, which come naturally from volcanic eruptions, are tiny particles that reflect sunlight to space. However, the combustion of fossil fuels containing sulfur has increased their presence in our atmosphere. As a result, there has been a net cooling effect because these particles reflect the sunlight. On the other hand, black carbon is formed by incomplete combustion, especially of coal, diesel fuels, biofuels, and outdoor biomass burning. Unlike

[11] *Ecosystems and Human Well-Being: Synthesis: A Report of the Millennium Ecosystem Assessment*. 2005. 4.

sulfate aerosols, soot absorbs sunlight, heating the air and reducing the amount of sunlight reaching the ground.

Water is an essential source for sustaining life. It plays a significant role in agriculture, hydropower generation, livestock production, industrial activities, forestry, fisheries, navigation, etc. Climate change is likely to have impacts on the Earth's water. According to a Climate Change Synthesis Report by the Intergovernmental Panel on Climate Change, "Anthropogenic influences have *likely* affected the global water cycle since 1960."[12] The melting glaciers and ice caps are one of the most broadcasted effects climate change has had on our water. The melted glaciers have increased water levels, affecting populations of people living in coastal regions. Variability in precipitation will increase the occurrence of floods and droughts. Additionally, the temperature is a primary determinant of water availability. Snow-regions are experiencing warmer weather, which melts the snow and increases runoff. In other regions, warmer water changes the chemical processes that occur. As climate change affects water, anthropogenic activities are polluting them too.

There has been an increase in demand for water as the population continues to grow and industrialization expands. As a result, we have urbanized and developed our agricultural practices to supply the growing population. However, in the process, we have polluted our water systems. There are two ways water pollution can occur; point source and nonpoint source. A point source refers to those which have a directly identifiable origin. Common point sources of pollution are wastewater effluent and storm sewer discharge. On the other hand, nonpoint sources of pollution come from different sources of origin, making them non-identifiable.

[12] IPCC, 2014: *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 6.

Examples of a nonpoint source of pollution are runoff from agricultural fields, septic-tank leachate, runoff from abandoned mines. Agricultural and sewage runoff can act as fertilizers as they release essential nutrients such as nitrogen and phosphorus to the environment that plants and animals need for growth. According to the Millennium Assessment, "Humans have already doubled the flow of reactive nitrogen on the continents, and some projections suggest that this may increase by roughly a further two thirds by 2050. Three out of four MA scenarios project that the global Aux of nitrogen to coastal ecosystems will increase by a further 10-20% by 2030."[13] The increase in nutrients can cause eutrophication, which are harmful algal blooms that lead to the formation of oxygen-depleted zones that kill all marine life. The death of marine life causes food insecurity because millions of people depend on them for food. Further, the loss of biodiversity affects marine ecosystems because productivity reduces.

Land use has the most significant impact on climate change. There are many different ways humans destroy the land, and it has a ripple effect causing more issues. Agricultural expansion is the primary driver of changes in land use. According to the Millennium Assessment, "More than two thirds of the area of 2 of the world's 14 major terrestrial biomes and more than half of the area of 4 other biomes had been converted by 1990, primarily to agriculture."[14] Thousands of acres of land with diverse trees and organisms are stripped and replaced with a monoculture. Additionally, due to the growing population, urbanization requires us to strip the land to be replaced with buildings, highways, industries, etc. Urbanization causes ecosystem fragmentation causing many organisms to live in narrow areas. Both agriculture and urbanization decrease biodiversity and cause an increase in greenhouse gases because there are

[13] Ibid, 15.
[14] Ibid, 4.

fewer trees to absorb the gases. The land offers many services to us, and if we continue to destroy it, there will be detrimental consequences to the environment and our way of living.

The development of infectious diseases is intrinsically tied to the ecosystem's failure to regulate their development. The ecosystem fails to regulate infectious diseases because climate change and human degradation of land have changed the natural systems like ‘ecosystem services’ set in place to monitor diseases. Additionally, the degradation of other ecosystem services indirectly ties to the development and spread of diseases. Ecosystem services are the benefits people get from the ecosystem. There are four different types of ecosystem services: supporting, regulating, provisioning, and cultural. Each ecosystem service has been affected by anthropogenic activities, which ultimately ties to why infectious diseases are becoming a more significant threat today and in the future.

Supporting Ecosystem Services

Supporting ecosystem services is a broader service that encapsulates factors necessary for producing other ecosystem services. Examples of supporting services include soil formation, photosynthesis, and nutrient and water cycling. The difference between supporting services and other ecosystem services is that it is not used directly by people. Unlike the other ecosystem services, supporting services aren't entirely in our control and occur over a long period. Changes in supporting services strongly influence other categories of ecosystem services; for this reason, it is best to focus on explaining how infectious diseases are associated with their degradation.

Water cycling is one of the many supporting ecosystem services. Water cycling is the natural way of collecting, purifying, and distributing the Earth's fixed supply of water from the environment to living organisms and then back to the environment. Nevertheless, humans have made major changes to the water cycles through structural changes to rivers, extracting water

from rivers, and climate change. Further, there has been an increase in water runoff and reduction in infiltration because we have covered much of the land with buildings, concrete, and asphalt. Additionally, climate change is expected to affect the water cycle in a multitude of different ways. For example, climate change is expected to increase the occurrence of seasonal droughts and floods.[15] Nevertheless, changes in the water cycle are expected to link to emerging infectious diseases.

As mentioned previously, climate change and human pollution have affected the water ecosystem services provided to us by Earth. As a result, natural water cycling is not as efficient as before, and there has been an increase in zoonotic diseases. We are experiencing an increase in emerging and re-emerging diseases. According to the World Health Organization, "emerging diseases are those that have appeared in a human population for the first time, or have occurred previously but are increasing in incidence or expanding into areas where they have not previously been reported."[16] The re-emergence of old water-borne diseases shows us that there has been a change in the environment that allows diseases to continue developing. Variability of precipitation doesn't allow for an even distribution of water. Areas experiencing flooding have a higher probability of developing a water-borne disease and exposing it to humans.

Regulating Ecosystem Services

Regulating services are key supporters of human health and well-being. Regulating ecosystem services are the benefits obtained from the balancing of ecosystem processes. These services include things like regulating climate, disease, waste treatment, water, etc. Regulatory ecosystem

[15] "Impacts, Risks, and Adaptation in the United States: The Fourth National Climate Assessment, Volume II." 2018. *National Climate Assessment*. 42.

[16] *Emerging Issues in Water and Infectious Disease*. 2003. World Health Organization. 6.

services are the main natural factors set in place to monitor the development and spread of diseases. The emergence of diseases depends on the changes in the ecosystem. For this reason, it is vital to discuss the role climate change has on the emergence of infectious diseases as it continues to change many ecosystems. Additionally, we must talk about what humans have done to cause changes in the ecosystem.

Diseases are a natural part of ecosystems. Animals harbor hundreds of parasitic organisms that don't get transmitted to humans unless they are under perfect conditions. The animals harboring these diseases are part of the biodiversity and an integral part of the ecosystem. These diseases bring down the population of the animals they infect, which maintains a dynamic equilibrium between the host population size and the disease. Disease regulation is very dependent on biodiversity. Keeping populations sizes at a certain number helps maintain the disease within their population and ecosystem. However, as humans continue to degrade habitats and climate change alters the ecosystems, there is a decrease in biodiversity which impacts the regulation of diseases.

Further, the natural regulation of diseases becomes more difficult as the temperature becomes warmer. Many disease-causing organisms are strongly influenced by environmental factors such as temperature. As mentioned before, anthropogenic activities have increased the presence of carbon and other gases, which lead to global warming. One major regulating ecosystem service that we affected was the carbon cycle. The carbon cycle is the cyclic movement of carbon in different chemical forms from the environment to organisms and then back to the environment. This cycle plays a role in determining the Earth's climate. If the carbon cycle removes too much carbon dioxide from the atmosphere, the atmosphere will cool, and if it generates too much carbon dioxide, the atmosphere will get warmer. The burning of fossil fuels

has added carbon dioxide to the environment and altered the carbon cycle. We have added CO2 faster than the carbon cycle can replace it, which has caused the warm of the atmosphere and changed the Earth's climate. According to the Millennium Assessment, "Currently, the biosphere is a net sink of carbon, absorbing about 1-2 gigatons of carbon per year, or approximately 20% of fossil fuel emissions."[17] Practices like deforestation have worsened the effects of the now deregulated carbon cycle. Forests absorb and store about one-third of the world's terrestrial carbon emissions as part of the carbon cycle. By clearing carbon-absorbing vegetation from forests, especially tropical forests, faster than they can grow back, there is a reduction in carbon absorption and further contributes to climate change. For this reason it is widely expected that climate change will affect infectious disease patterns.

Warmer weather caused by climate change alters the number of pathogenic organisms and disease vectors as well as their regional dispersion, influencing which communities are at risk. Thus, if climate change continues at this rate, the number of diseases we will encounter will increase. Warmer temperature can increase the biting rate of disease-carrying vectors and change the rates at which they contact humans. Further, warmer weather can impact the transmission season and incubation time of a pathogen. In cases where the transmission season increases and incubation time decreases, more people are at risk of encountering a disease-carrying organism. An example of this would be people in high-altitude regions having protection from malaria because the parasite cannot develop efficiently in low temperatures. Overall, anthropogenic activities affect regulatory ecosystem services' ability to do their job of regulating diseases and climate. As a result, the probability of new and old diseases spreading increases.

Provisioning Ecosystem Services

[17] *Ecosystems and Human Well-Being: Synthesis: A Report of the Millennium Ecosystem Assessment*. 2005. 113.

Provisioning ecosystem services entails all goods produced or provided by the environment. Examples of these services are foods like fish, fruits, vegetables, livestock, etc. In other words, a provisioning service is anything that can be extracted from nature to benefit people. Other than food, provisioning ecosystem services include clean water, timber, wood fuel, natural gas, oils, etc. As the population continues to increase, the demand for provisioning services increases. Humans are using provisioning services at an unsustainable rate. According to the Millennium Assessment, half of the provisioning services are being degraded or used unsustainably.[18] Though we have created technology to increase the amount of food and other provisioning services the environment provides, we are still taking more than can be replaced. As a result, we experience fisheries collapsing, and many fish stocks are being overexploited. If we continue to use provisioning services unsustainably, we can destroy them to no return. Millions of lives will be affected by the destruction of many services.

Cultural Ecosystem Services

Cultural ecosystem services can be described as the nonmaterial value an ecosystem offers. This nonmaterial value includes education, recreation, spiritual connections, stress relief, aesthetic pleasure, and tourism. An example of a cultural ecosystem service is the Grand Canyon National Park because of its aesthetic views and recreational options. Overall, cultural ecosystem services contribute to human health and well-being and society as a whole. Most people are able to connect and find some relief from the natural environment. However, like other ecosystem services, cultural services are overlooked by many. Humans altered the diverse environment there once was to accommodate urbanization, transportation, etc. Recreation and tourism are major components of cultural services; thus, humans have modified natural areas to maximize

[18] E*cosystems and Human Well-Being: Synthesis: A Report of the Millennium Ecosystem Assessment*. 2005. 39.

their benefits. As a result, the cultural connection we had to the environment has dwindled. The spiritual connection to the natural environment has been lost because of sacred sites and species loss. It has been difficult to protect most cultural services because their value cannot be measured. As people's connection to the natural environment lowers, it has been easier to destroy them and profit.

Chapter 2. Consequences of a Sick Economy and Society

The COVID-19 pandemic has sparked an interest in the effects of diseases in the economy and social life. At the start of the COVID-19 pandemic, most of the population experienced significant modifications to their everyday lives with the hope of one day being able to return to "normal." As a precautionary measure to limit the spread of the virus, many nations required their citizens to social distance, self-isolate, work or take classes from home, and had travel restrictions. There was also a tremendous amount of chaos leading the public to start panic-buying and stockpiling food and sanitary products. The COVID-19 pandemic gives us many examples of how diseases significantly affect economic and social lives.

Economic Consequences

The COVID-19 pandemic caused a recession unlike others experienced before. Previous recessions were localized and began due to factors like asset-valuation "bubbles" popping, financial crises, or demand or supply shocks. Usually, there was a build-up to standard recessions. However, the COVID-19 pandemic halted economic activity almost immediately. Additionally, unlike previous recessions, which were localized, the COVID-19 recession affected entire nations and most of the world. Due to government mandates, this recession had significant supply chain disruptions on national and global scales. Nevertheless, nations and their

people were affected differently. Some nations had more factories and jobs that were considered essential. An example would be countries that prioritized manufacturing masks. As a result, some nations didn't encounter higher unemployment rates during the pandemic. Nevertheless, this paper will primarily focus on how the COVID-19 pandemic impacted the United States economy.

The economic and social consequences of COVID-19 greatly depended on how the government and its citizens reacted. In the United States, the economy and social life suffered many fluctuations because of how the government and citizens responded. According to Goenka and Liu's framework, "non-linearity in the disease dynamics can induce fluctuations in the economy."[19] In the United States, there were multiple waves of COVID-19, in which infected cases would decrease and then sky-rocket again. The non-linearity of COVID-19 cases can be tied to government mandates and citizens' actions. For example, in the Summer of 2020, there was a noted increase in cases because more people were leaving their homes instead of following the self-isolation mandate. Additionally, in the Summer of 2021, there was a sharp increase in the number of cases because people were allowed to travel to other countries. Nevertheless, the cycle between going out and staying in keeps a non-linear dynamic to COVID-19, causing economic fluctuations. These economic fluctuations make it hard for governments to know what steps to take next because nothing is predictable. Instead, we see how the economy struggles as a result because many political choices are temporary fixes.

At the early stages of the pandemic, most governments decided to have their citizens stay home, whether they were infected or not. Though governments put public health before any other

[19] Goenka, Aditya, and Lin Liu. 2012. "Infectious diseases and endogenous fluctuations." Economic Theory 50, no. 1: 125+. *Gale OneFile*: Business. 136.

problems, this had many cascading effects on the economy. First, in the United States, millions of people were suddenly unemployed and had no income. This was a result of the Stay-at-Home orders, which forced people to stay home instead of going out and working. The public could only leave if they were shopping for essential products or were considered an essential worker. As a result, the United States unemployment increased by 5.3% to 24.7 million while generating an "existing loss of nearly 30,000 work months and US$860-3,440 billion labor income."[20] Unemployment is influenced by economic activities. Now that economic activity was low because people were buying less, businesses cut jobs and unemployment rises. An increase in unemployment can have devastating effects on the economy as a whole.

A high unemployment rate has the potential to disrupt a country. The economy is a cyclical system; hence, when people are jobless, they can't contribute to the economy in terms of production. Unemployment can cause others to lose their jobs, causing the cycle to continue. A high percentage of unemployment means the government has to borrow more. This is because there is less tax revenue since there are fewer people paying income tax and spending less on leisure items. Further, the government is spending more on unemployment, housing benefits, and income benefits. According to a report by the Congressional Research Service, the United States' spending on federal benefits and services for people with low income peaked at $1.078 trillion in 2020.[21] These benefits and services include things like health care, cash aid, and food assistance. Further, using economic terms, higher unemployment means a lower gross domestic product (GDP) for the economy. This is because there is less consumer spending, more government spending, and imports and exports trade costs increased. Additionally, there are fewer people

[20] Barua, Suborna. 2021. "UNDERSTANDING CORONANOMICS: THE ECONOMIC IMPLICATIONS OF THE COVID-19 PANDEMIC." Journal of Developing Areas 55, no. 3: 435+. Gale OneFile: Business

[21] Landers, Patrick A, Karen E Lynch, Jessica Tollestrup, Gene Falk, and Conor F. Boyle. 2021. *Federal Spending on Benefits and Services for People with Low Income: FY2008-FY2020.* R46986. Congressional Research Service.4.

working, meaning there are lower production and exports, as well as imports due to lower income. According to an assessment by the World Bank Group, there was a global GDP loss of 3.9%.[22] This shows us that every country suffered economically as a result of a combination of things, but unemployment contributed to their economic struggle. Fortunately, the United States government aided the unemployed citizens.

As a result of the high unemployment rates, the United States government had to distribute stimulus checks to help its citizens and avoid going into a national recession. It is estimated that the United States government spent a total of about $2 trillion in a 'virus-aid package.' Additionally, it is estimated that globally by mid-June 2020, governments spent $11 trillion; about $5.4 trillion went to the stimulus checks and another $5.4 trillion in loans, equity injections, and guarantees.[23] As the COVID-19 pandemic continues, these numbers are only expected to increase. Though the stimulus checks and business loans provided some relief, it was still not enough for citizens who had been unemployed for months. The lives of citizens drastically changed since many lacked income and were required to quarantine for months. Many were kicked out of their homes because they weren't able to pay their rent or mortgage. Additionally, while people are being booted from their homes, housing and rental prices are sky rocketing.

The United States is not new to housing instability. However, the COVID-19 pandemic's economic toll has only worsened housing in the US. The US government has had to assist in rent, and there has been an economic loss in what wasn't made from rent and mortgage. The US is currently experiencing a shortage of houses compared to an increase in demand. The COVID-

[22] Maliszewska, Maryla, Aaditya Mattoo and Dominique van der Mensbrugghe. 2020. *The Potential Impact of COVID-19 on GDP and Trade: A Preliminary Assessment.* The World Bank Group. 6.
[23] Manhas, Rashmi, and Ashutosh Kumar. 2021. "Government Policies Towards Businesses During Pandemic: Special Reference to MSMEs." Abhigyan 39, no. 2: 1+. Gale OneFile: Business

19 pandemic has led people to stay at home and less likely to sell their homes. People are searching for a place to live for different reasons. Some work remotely and don't have to commute; hence, they can move to any region they desire. Others were evicted for not paying their rent or mortgage and are looking for a new place to live. The US has low levels of new-built homes because of supply shortages. Due to the difference in supply and demand, the prices for homes have become increasingly high, especially in metro areas. According to Zillow, the average home in the US is valued at $331,533 as of February 2022 and has increased 20.3% over the past year.[24] Low-interest rates have made housing more accessible, but the competition has become more intense. Fortunately, increase demand in housing raises economic activity, but it also means

Not only did unemployment rise, but many businesses permanently closed because they could not open, sell their products, or have any employees. People with "essential" jobs and remote jobs were considered among the lucky in society. According to the Proceedings of the National Academy of Sciences, 43% of businesses had temporarily closed, and 38% were expected to remain closed.[25] This means unemployed people were faced with more competition when applying to new jobs, causing them to stay unemployed longer. Fortunately, the United States government created programs to help businesses financially through loans and grants. Some examples include the small business tax credit program, emergency capital investment program, and paycheck protection program. Based on a report of the Small Business Administration, the United States helped small businesses affected by the COVID-19 pandemic

[24] Zillow, Inc. 2022. “United States Home Prices & Home Values.” Zillow. https://www.zillow.com/home-values/.
[25] Bartik, Alexander W., Marianne Bertrand, Zoe Cullen, Edward L. Glaeser, Michael Luca, and Christopher Stanton. 2020. “The Impact of Covid-19 on Small Business Outcomes and Expectations.” Proceedings of the National Academy of Sciences 117 (30): 17656.

by spending $760.9 billion in 2020 and $378.5 billion in 2021.[26] Though the government did this to keep the economy afloat, there were also concerns about how businesses were able to pay back the loans. With corporate debt at an all-time high and the economy barely recovering, corporations are likely to experience higher debt as they are unable to make high profits. Unfortunately, a country's economy influences its citizens' lives heavily. Thus, throughout the COVID-19 pandemic, many people experienced unfavorable lifestyle changes.

Social Consequences

As nations went on lockdown, the public was required to stay indoors for long periods, and the times people could go out, they had to social distance and wear facemasks. The shift from the previous norms came as a shock to everyone, but some were able to adapt quicker than others. There is still a public divide on how to approach public interactions throughout the pandemic. Many people and businesses encourage the use of facemasks, while others refuse to wear them. The pandemic was a reality check to many people because they were faced with uncertainty, morbidity, and mortality. As a result of such pressures, there were noticeable effects on the mental health of many citizens.

The first instance we see the social effects of COVID-19 is in family structures. When the pandemic first started in 2020, a large amount of pressure was set on parents, especially mothers. The expectations of being a parent, a teacher, and an employee were all placed on them at once. Before the pandemic, many parents had a routine to avoid chaos, having their children in school and after-school activities while they were at work. However, now that the pandemic caused them to be canceled, parents were the sole supervisors of their children with no time for breaks. Parent-child interactions increased, and some parents felt closer to their children while others felt

[26] Dilger, Robert Jay. 2022. Small Business Administration (SBA) Funding: Overview and Recent Trends. R43846. Congressional Research Service. 2.

they fought more.[27] Though many people were remote or waiting to return to work, mothers carried most of the burden in the household. Mothers were expected to stay home and care for their children while learning remotely. According to a report by the Congressional Research Service, 1.6 million mothers were kept from returning from the workforce because they had to take care of their children.[28] Nevertheless, not only did the relationship between parents and children, but parents' mental health changed too.

Additionally, some parents experienced the added layers of pressure through employment insecurity and health problems. As a result, there has been a noticeable increase in mental health problems in families. A cross-sectional study in Canada found that more parents have reported their mental health has deteriorated since the pandemic compared to people with no children.[29] Parents were led to cope with their experiences in different ways. Parents with higher levels of depression, anxiety, and stress were found to drink alcohol more.[30] Overall, due to the pandemic's pressures on parents, there was an impact on mental health and alcohol consumption from parents. This can lead to mental health and developmental effects in the children and/or adolescents in the family.

The pandemic has had developmental and mental health risks in children and adolescents. The government-mandated school closures affected millions of students worldwide. Children had their routines disrupted as parents scrambled to change their schedules and availability to fit their children. Children and adolescents from abusive homes would experience the most severe

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[27] Gadermann, Anne C., Kimberly C. Thomson, Chris G. Richardson, Monique Gagné, Corey McAuliffe, Saima Hirani, and Emily Jenkins. 2021. "Examining the impacts of the COVID-19 pandemic on family mental health in Canada: findings from a national cross-sectional study." 7.
[28] Weiss, Martin A., and James K. Jackson. 2021. Global Economic Effects of Covid-19. Congressional Research Service. 5.
[29] Gadernann et al, “Examining the impacts of the COVID-19 pandemic,” 5.
[30] Lamar, M. R., Speciale, M., Forbes, L. K., Donovan, C. (2021). The mental health of U.S. parents during the COVID-19 pandemic. Journal of Mental Health Counseling, 43(4):

consequences from the pandemic. For some, the school was an escape from abusive homes, and now that the government forced citizens to stay home, children couldn't escape their parents' abuse. Additionally, in households with a history of addiction, the children's exposure to harmful substances increases. Some studies found that growing up in an abusive home is linked to aggressive behavior, emotional and behavioral problems, and educational difficulties in children.[31] Further, growing up in this environment has long-term effects noticed in adulthood. For example, the same behavioral problems formed during childhood can extend to adulthood and impact future relationships, including those with their children.[32] The COVID-19 pandemic forced many children to stay in these conditions for months on end with little to no escape. Unfortunately, due to schools closing, children had less access to the number of adult and peer resources available. Thus, children in abusive homes no longer have an outlet to release their emotions.

The COVID-19 pandemic stole critical developmental years from children and adolescents. Younger children miss out on social interactions crucial for their social development. Children ages four to eight were expected to learn social interactions remotely, which doesn't compare to face-to-face relations. On the other hand, the COVID-19 pandemic affected adolescents differently. Unlike younger children, adolescents were able to gain social interactions online. Instead, they had to come to terms with knowing they missed out on important "rite of passage" milestones like graduation. There was an increase in social media usage by adolescents because they couldn't see their peers and friends. Though adolescents could continue interacting with others, they were at higher risks of being vulnerable because they were

[31] Turner, Raymond A., and Henry O. Rogers. 2012. *Child Abuse : Indicators, Psychological Impact and Prevention.* Psychology of Emotions, Motivations and Actions. New York: Nova Science Publishers, Inc. 7.
[32] Ibid,7.

more aware of social problems. Adolescents are aware of their parents' declining mental health, unemployment, and food and house insecurity. Hence, they had to deal with the anxiety of a major change occurring at any moment. Everyone in school was likely to experience a decrease in their learning quality. A study found that children made "little or no progress in learning during the closure," especially those from economically disadvantaged backgrounds with low-quality technology. Children had to go through the hurdles of remote learning, but they weren't able to learn at their full potential because teachers couldn't do one-on-one learning. Adding to the pressure, many families faced home and food insecurity.

Early in the COVID-19 pandemic, panic buying caused massive amounts of shortages. Due to the stay-at-home mandate, many people decided to buy in bulk to shop less and decrease their risk of getting the coronavirus. However, it was a privilege to buy in bulk for some because others didn't have the monetary funds. As mentioned before, millions of people experienced unemployment during the pandemic, which contributed to many families' food insecurity. Additionally, the lower labor force caused a cycle that led to supply chains interruptions, leaving shelves empty. Overall, there was a lack of access to food. According to a report by Feeding America, in the United States, about 42 million people, 13 million being children, experienced food insecurity in 2021.[33] Before the pandemic, many schools provided children free or price-reduced lunches, which allowed parents to only focus on feeding their children one meal. However, the combination between the stay-at-home mandate, unstable income, and food supply shortages created food insecurity for millions of families. Though there are federal safety nets like the Supplemental Nutrition Assistance Program (SNAP), the competition to be accepted into the program became intense. To receive assistance, it came down to who lived in worse

[33] Hake, Monica, Adam Dewey, Emily Engelhard, Mark Strayer, Sena Dawes, and Tom Summerfelt. 2021. Rep. *The Impact of the Coronavirus on Local Food Insecurity in 2020 and 2021*. Feeding America.

conditions while accommodating to all the required qualifications. Food insecurity is not the only thing people had to worry about; they also had to worry about housing.

Since millions of people were unemployed due to COVID-19, there was widespread concern on how they would continue to pay their rent or mortgage. The Aspen Institute estimated about 30 to 40 million people in the United s were at risk of eviction.[34] In September 2020, the Centers for Disease Control and Prevention (CDC) slightly relieved millions of people by establishing a national eviction moratorium. For a couple of months, the eviction moratorium helped millions stay housed until it stopped its assistance in July 2021, leaving many low-income families struggling to pay rent again. After the eviction moratorium, federal assistance programs applications rose. The Office of Temporary Disability Assistance and the Emergency Rental Assistance Program (ERAP) received thousands of applications after the moratorium ended. These programs only aided a small portion of the population, suggesting that thousands of others had to find how to pay for shelter on their own. As people begin to go back to work, the housing insecurity concern will dwindle, but black people and low-income people will continue to struggle.

The COVID-19 pandemic altered many everyday lives, causing a significant shift in social interactions. In the early stages of the pandemic, there was a widespread fear of social interactions. People didn't want to face each other under constant fear of getting the coronavirus. However, as nations lifted their isolation mandates and only required face masks, another issue presented itself. Facial expressions make up a portion of body language, and now people cannot comprehend people's emotions and intentions because a mask covers half their faces. In other

[34] Benfer, Emily, et al. 2022. “The COVID-19 Eviction Crisis: An Estimated 30-40 Million People in America Are at Risk.” The Aspen Institute. https://www.aspeninstitute.org/blog-posts/the-covid-19-eviction-crisis-an-estimated-30-40-million-people-in-america-are-at-risk/.

words, a majority are missing social cues because they cannot understand social interactions at the same level as before. For example, the mouth allows people to notice angry and happy expressions. However, that was no longer possible, and people had to rely on eye expression to determine emotions. As a result, people were more cautious during their social interactions or avoid social interactions altogether.

Chapter 3. Unjust Diseases

Though everyone was affected by the COVID-19 pandemic, low-income marginalized people of color suffered the most. In the United States, there has been a long history of people of color, especially African Americans/Black people, receiving unequal treatment in social institutions. During the COVID-19 pandemic, the inequalities in these marginalized communities were exacerbated and exposed to everyone how troubling it can be to public health. The public noticed the inequalities in health care and housing and how low-income people of color were suffering the most during these harsh times. If we want to create an equal and just society, we must discuss and analyze the impact inequality has on people because ignoring this issue will lead to thousands of deaths.

Environmental racism is one among many issues the COVID-19 pandemic brought up for discussion. Benjamin Chavis, a prominent environmental activist, defines environmental racism as:

> racial discrimination in environmental policymaking, the enforcement of regulations and laws, the deliberate targeting of communities of color for toxic waste facilities, the official sanctioning of the life-threatening presence of poisons and pollutants in our communities, and the history of excluding people of color from leadership of the environmental movements.[35]

[35] Bullard, Robert D., and Benjamin Chavis . 1994. “Preface.” Essay. In *Unequal Protection: Environmental Justice and Communities of Color*, San Francisco: Sierra Club Books.

Chavis' definition of environmental racism encompasses the different factors that keep people of color stuck at the bottom. People of color have been wiped of any political or financial power, causing them to stay stuck in areas with factories that pollute their air, drinking water, and even food. Even when these communities voice their concerns, the rich and usually white policymakers neglect them and give their attention and funding to other promising neighborhoods. Further, policies and laws are disproportionately reinforced. When industries violate environmental laws, there is only an effort to stop them if the community affected is affluent or white. Chavis' definition acknowledges that people of color are placed in "sacrificial zones." Historically, marginalized people of color have been forced to live in undesirable areas through practices like redlining. Redlining is a discriminatory banking practice that would label mostly Black neighborhoods as risks and make it harder for Black families to move away from their communities. As more and more industrial plants move to these communities, they expose citizens to hazardous contaminants. These contaminants and polluters are found to lead to adverse health effects like asthma and cancer. Environmental racism reveals the broken systems that keep people of color in hazardous environments.

A modern example of environmental racism and environmental justice is the Flint, Michigan, water crisis. Flint has a primarily Black population, yet the state government is ruled mainly by whites. In 2014 in an attempt to save money, the city switched its water supply from the Detroit River to the Flint River. However, the water safety levels were not monitored beforehand and were assumed to be safe for everyday use. Shortly after the switch, residents noticed the water's discoloration, smell, and odd taste, caused by a corroded pipe leaking lead. Government officials overlooked and ignored the problem despite the overwhelming evidence that the Flint River was not safe for use. Flint's lack of representation in the government caused

officials to dismiss their problems and continue to reap economic benefits. Furthermore, Flint's exclusion in political roles decreased their ability to change the state government's decision. Hence, until the government took the initiative, residents were forced to buy clean water and water filters because their water stayed contaminated. Fortunately, there is the Environmental Justice Movement that attempts to fight against these inequalities.

As a result of the mistreatment of people of color, the Environmental Justice Movement (EJM) grew. The Environmental Justice Movement began as spread out grassroots movement when communities noticed the harm corporations were causing their health and environment. Small groups of people would come together to fight the larger polluting corporations and, in the process, gain massive amounts of support as more and more people learned about the injustices occurring. The Flint, Michigan, water crisis is an example of this occurring. Videos of the contaminated water gained traction online, and thousands of people demanded the Michigan state government give Flint residents access to clean water. Additionally, other people donated money and clean water to residents. As more people learned about environmental racism, they recognized that their conditions were hazardous, leading to a widespread fight against polluting corporations. Nevertheless, Environmental Justice can be defined in multiple ways, yet environmental studies Professor David Pellow has one of the most critical definitions.

In his article, Pellow expands on the term "Critical Environmental Justice Studies" to dig deeper into environmental justice.[36] Pellow claims there are four pillars to understanding environmental justice. In the first pillar, Pellow criticizes how previous environmental justice

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[36] Pellow, David N. 2016. “Toward a Critical Environmental Justice Studies.” *Du Bois Review: Social Science Research on Race* 13 (2)

generations couldn't decide whether environmental justice should be about environmental racism or economic inequality. Pellow argues that this indecisiveness divides and weakens the environmental justice movement. Instead, he suggests that environmental racism and economic inequality are equally important to discuss, and there should be no prioritization of either. Pellow's second pillar is a multi-scalar approach that encourages understanding environmental justice not only from local case studies but through regional, national, and transnational issues. It is essential to acknowledge that environmental justice has to occur globally to create a fair system. The third pillar in Pellow's argument suggests that working with the government to put out new legislation would not be helpful as it would be working with the very same systems that are part of the problem. In other words, Pellow believes that reform is not possible; instead, the systems must be replaced entirely. This is Pellow's weakest argument from the four pillars because it overlooks the usefulness of the government in creating policies that will defend against environmental racism. The final pillar argues that environmental injustice is about early death or being marked for "erasure." Pellow suggests that marginalized peoples are dying because people are not just negligent but malicious in their affairs. He wants us to recognize that people that are exposed to environmental hazards die sooner and that corporations knowingly continue to cause this damage. In the fourth pillar, Pellow wants us to move beyond abstract equity and focus on the grim, tangible reality that people die due to environmental injustice.

Understanding environmental justice on a grander scale allows us to understand how environmental racism and other inequalities affect minorities communities. Pellow's four pillars allow for a deeper understanding of environmental justice and understanding it in terms of pandemics. Applying Pellow's first pillar, it is evident that environmental racism and economic inequality both influence people's experience with a disease. Pellow's fourth pillar, which

argues that people of color are "disposable," bleeds into why they have such a negative experience. The health impacts caused by hazardous contaminants from environmental racism led to social and physical vulnerabilities that leave people of color more exposed and susceptible to diseases like COVID-19. Since people of color are perceived as having little contribution to society, and their lives are valued less than their counterparts, they will continue to be more susceptible to diseases. Furthermore, structural and economic inequalities make it harder for people of color to have access to and trust medical professionals and cause apparent disparities in the quality of medicine. Pellow's third pillar, the multi-scalar approach, demonstrates the inequalities on a global scale and not just in the United States. Citizens from developing countries are put last during global pandemics. As the case study showed, citizens of African countries continue to suffer from malaria because their countries do not have the privilege to focus on the disease. As a result, people continue to die, causing the erasure of people, despite their deaths being preventable. Nevertheless, as this chapter progresses, many of Pellow's arguments from the four pillars will be brought up as the development and spread of diseases have deep ties to environmental injustice and racism.

People with pre-existing health conditions are more vulnerable and have higher chances of contracting a disease. These pre-existing health conditions cause people to become sicker than the average person, taking longer to recover or even passing away. According to the CDC, some pre-existing health conditions that increase the risk for severe illness include cancer, chronic kidney disease, chronic liver disease, lung problems, heart diseases, etc. Though these health issues can occur for many reasons, studies have found that pollution increases people's chances of developing them. According to V.K Ahluwalia, in *Environmental Pollution and Health,* air pollution can cause many health problems such as "permanent respiratory illness; impairment of

vision; damaged lungs and kidneys."[37] Further, water polluted by organic residue, pathogens, and toxic chemicals are found to cause more health problems. Toxic chemicals in water can cause cancer, liver and kidney damage, harm the circulatory system, and many more health issues.[38] It is essential to understand that exposure to pollution and toxic chemicals causes health issues because it indicates why some communities are more susceptible to diseases. People with higher exposure to pollutants and higher records of health problems will have a higher risk of getting diseases. Thus, industries that continue to pollute Black and Latinx neighborhoods also increase the probability of them contracting diseases and spreading them. Systemic and social inequalities make it harder for people of color to fight against this and find support to treat their illnesses, creating an environment that keeps them sick.

The long history of medical inequality and misconduct has resulted in medical mistrust, which can negatively affect public health during COVID-19. Medical mistrust is the "distrust of health care providers, the health care system, medical treatments, and the government as a steward of public health."[39] There have been many instances in which hospitals showed people of color that they don't see them as equal value. Nevertheless, this medical mistrust has led to African Americans having "poor self-reported health, lower quality of life, and decreased uptake of screening and preventative behaviors and vaccines."[40] During the COVID-19 pandemic, medical mistrust has been prevalent in the United States. It is shown by the belief that COVID-

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[37] Ahluwalia, V. K. 2015. *Environmental Pollution and Health*. New Delhi, India: The Energy and Resources Institute (TERI). 25.

[38] Ibid., 50.

[39] Bogart, Laura M., Bisola O. Ojikutu, Keshav Tyagi, David J. Klein, Matt G. Mutchler, Lu Dong, Sean J. Lawrence, Damone R. Thomas, and Sarah Kellman. 2021. "Covid-19 Related Medical Mistrust, Health Impacts, and Potential Vaccine Hesitancy among Black Americans Living with Hiv." JAIDS Journal of Acquired Immune Deficiency Syndromes 86, no. 2: 200.

[40] Ibid., 200.

19 is a conspiracy and was made in a lab by the government. The medical mistrust is also shown by the hesitancy to go to the hospitals and receive treatment and the hesitancy of the vaccine when it was first announced. The medical mistrust in the African American community can become a problem for public health because it means the virus will stay around for longer. If people refuse to get treatment and the vaccination, it increases the likelihood of the virus spreading, which puts lives at risk.

The medical mistrust of the African American community combined with the systematic racism in the healthcare industry has led to a disparity in COVID-19 cases and hospitalizations. As discussed in the previous paragraph, the African American community is more likely to be hesitant about going to the hospital for treatment and are more hesitant to take the vaccine. As a result, they suffer more because compared to Whites. Black people were found to have a 153% higher hospitalization rate and 105% higher death rate than Whites.[41] It's essential to consider that systematic racism and medical mistrust aren't the only reasons the Black and Latinx community have higher COVID-19 rates than Whites. The deep roots of inequality in American society continue to put people of colors lives at risk. In major catastrophic events like this COVID-19 pandemic, people of color will be most affected unless there are systematic changes.

Drawing from Benjamin Chavis and David Pellow's definitions of environmental racism and justice, we notice that people of color are constantly placed below their white counterparts, impacting how they contract diseases and treat them. Pre-existing health conditions place people of color in more vulnerable positions but so do their living conditions. Minorities, especially those with immigrant backgrounds, are more vulnerable to diseases because of their poverty,

[41] Mude, William, Victor M Oguoma, Tafadzwa Nyanhanda, Lillian Mwanri, and Carolyne Njue. 2021. “Racial Disparities in Covid-19 Pandemic Cases, Hospitalisations, and Deaths: A Systematic Review and Meta-Analysis.” Journal of Global Health 11.

overcrowded housing conditions, and high concentration in jobs where social distancing is challenging. In chapter 3 of her book *Noxious New York: The Racial Politics of Urban Health and Environmental Justice*, Julie Sze states that "to be poor is in many ways to be invisible."[42] Sze notices that poor Black people often have worse living conditions, living with things such as cockroaches and mold. There are higher percentages of Black and Hispanic people living in public housing in most urban areas. Public housing has a history of segregation and neglect, causing harmful living conditions. Sickness keeps people poorer because they constantly have to call out of work and pay for high health costs. Living in unfavorable conditions and tight spaces will keep minority populations vulnerable compared to other populations.

Additionally, peoples working conditions keep them at a higher risk. Though the COVID-19 pandemic caused drastic increases in unemployment, Black people and Latinx are more likely to be essential workers. One study found Black people hold the top nine essential jobs that would potentially expose them to COVID-19, increasing the chances of infecting themselves and their families.[43] Thus, there was still a significant disadvantage even for those who were lucky enough to continue working during a nationwide lockdown. Though other non-Hispanic white people had essential jobs, many employers provided them with adequate social distancing or equipment to protect themselves. Despite the threatening working conditions, joblessness is not an option for many people of color who already live paycheck-to-paycheck. As a result, people continued to put their lives at risk to ensure they could afford their rent or other needs. The combination of home overcrowding and exposure to COVID-19 increases the

[42] Sze, Julie. 2007. *Noxious New York: The Racial Politics of Urban Health and Environmental Justice*. Cambridge Mass: MIT Press/Cambridge Mass. 98.
[43] Rogers, Tiana N., Charles R. Rogers, Elizabeth VanSant-Webb, Lily Y. Gu, Bin Yan, and Fares Qeadan. 2020. "Racial Disparities in Covid-19 Mortality among Essential Workers in the United States." World Medical & Health Policy 12 (3): 320.

probability of entire families sharing the virus. For this reason, there is a noticeable difference in COVID-19 cases based on race. People of color had higher rates of COVID-19.

The pandemic not only disproportionately impacted people of color in terms of health care, but it also affected them in unemployment. As a result of the government restrictions, many businesses shut down and laid off their workers. Unemployment skyrocketed, and African-Americans and Latinx suffered the most. Before the pandemic, there was already a difference in unemployment between Black and White citizens. Past studies have found that when the economy worsens, the Black community experiences more unemployment than Whites. At the beginning of COVID, Latinx experienced the hardest unemployment because their jobs made them more vulnerable to being laid off.[44] Job insecurity was a big problem for everyone during the pandemic. Still, we must notice that the Black and Latinx communities have the lowest average incomes in the country. Thus, being laid off meant that they could no longer afford some of their basic necessities like food and shelter. For this reason, there was a surge in applications to government unemployment benefits and other government programs.

In addition to race, socioeconomic background plays a significant role in how COVID-19 impacts people's lives. In times of COVID-19, a higher socioeconomic status meant you had better access to healthcare and could afford better treatment. On the other hand, people with lower incomes had to wait for hours to be treated and hope that their hospital bill wouldn't financially strain them or their families. Unfortunately, it is mostly African Americans and Hispanics placed in these conditions. In his book, *Corona, Climate, Chronic Emergency, Professor* Andreas Malms argues this as a "history of class struggle."[45] Rich people can afford

[44] Fairlie, Robert, Kenneth Couch, and Huanan Xu. 2020. “The Impacts of Covid-19 on Minority Unemployment: First Evidence from April 2020 CPS Microdata.”. 25.
[45] Malm, Andreas. 2020. In *Corona, Climate, Chronic Emergency*. Verso Books. 65.

excellent healthcare, get insurance, hospitals with enough ventilators, and even self-isolate in their own space. In contrast, poor people were left to struggle on their own. Further, Malms explains that this issue is rooted in the history of colonialism. The rich countries with the resources to treat COVID and get the vaccine first were the ones that wiped out developing countries of their resources leading them to struggle to advance for years. Overall, in developed countries like the United States and developing countries, being able to treat COVID-19 favors those that have money.

Developing on Andreas Malms' ideas of colonialization, the COVID-19 pandemic exposed the inequalities between countries. Although United States' Black and Latinx communities have below-average experience, it is still better than other developing countries. Unemployment was a global occurrence as many countries had a lockdown. Like the United States, unemployment was followed by an income loss and increased food insecurity. Unlike the United States, many developing countries do not have the monetary funds to provide their citizens with financial support. Thus, many citizens ignored the lockdown orders to provide their families with their needs. Food insecurity can have long-term effects on children. Early child malnutrition can have educational, developmental, and socio-economic problems. Additionally, there were significant consequences to education in developing countries. Like in the United States, rich people could continue their education, yet low-income children were forced to stop their education. Access to adequate health supplies was a struggle for developing countries. Due to their lack of money and power, developing countries are overlooked and cannot handle high amounts of cases like others.

Despite creating advanced health care devices, they are not always accessible to everyone. In the first year of the COVID-19 pandemic, most countries experimented with the

best methods for testing and treating the virus. The early stages of diagnostic and antibody tests would take almost two weeks to get the results. Additionally, test kits were in the production process and extremely hard to acquire. Hence, many developing countries would only test their wealthy or essential citizens, while the rest remained untested. People infected by the COVID-19 virus often experienced lung problems and were placed on ventilators. Developed countries like the United States had such high cases that they reached periods in which patients couldn't be treated for the virus. On the other hand, developed countries didn't have the proper medical equipment before cases spiked. Necessary medical equipment like ventilators is minimal, causing many citizens to suffer more and die.

Chapter 4. Public Policies and Pandemic Preparedness

The spread and destruction of COVID-19 caught everyone by surprise. Though we have had infectious diseases in the past, none were at the threat level of COVID-19. Nevertheless, our previous experience with infectious diseases like Ebola and H1N1 has taught us how we should prepare and approach infectious diseases. Over time, countries have developed strategies and plans on what to do in the case where a disease is spreading. The United States has explicitly established the Centers for Disease Control and Prevention, or the CDC, and other programs/agencies to work with other countries to strengthen global health security preparedness so countries can respond quickly. Since the beginning of the pandemic, the public has seen how the CDC, the World Health Organization, and the presidential administration influenced how the pandemic played out.

Influenza is not a newly introduced virus. It has been around for over a century, as it continuously evolves and infects people every year. Influenza, also known as the flu, is a

contagious respiratory illness caused by viruses that infect the nose, throat, and sometimes the lungs. Common symptoms of influenza A include fever, cough, sore throat, runny or stuffy nose, muscle or body aches, etc. The most common and safe way to prevent the flu is to get the vaccine each year. In 2006, when the H5N1 avian flu was spreading, Congress provided $6.1 billion for pandemic planning.[46] Despite the research and knowledge on influenza, 2009 showed the unpredictability of viruses and the urgency for proper government planning.

The pandemic of influenza A (H1N1) in 2009 exposed that the world was ill-prepared for a global health crisis. Despite its low severity, its extremely rapid spread led the World Health Organization, or WHO, to declare it a pandemic. Though there was already a vaccine to protect the public from influenza, it was ineffective against the new pandemic strain of H1N1 spreading across the globe. The new H1N1 strain was a combination of old strains of influenza A and subtyped H1N1 virus. Oddly enough, the new strain targeted the young population more than the older population, those 60 and older. This was because older people had antibodies against this virus from previous exposure. In the first year, the CDC estimated that 151,700-575,400 people died from influenza illnesses, 80% of those were people younger than 65 years old.[47] Although there were deaths, the H1N1 virus wasn't severe compared to other pandemics; most people infected were able to recover with little to no treatment. The United States government approached the pandemic differently than how they did with COVID-19.

The World Health Organization holds all authority regarding the United States' public health. It is responsible for research, agenda-setting, establishing norms and standards, collecting evidence for policies, supporting other countries, and monitoring health trends. The World

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[46] Bartolotti, Charles R. 2010. *The H1N1 Influenza Pandemic of 2009. Public Health in the 21st Century.* New York: Nova Science Publishers, Inc. 24.

[47] "2009 H1N1 Pandemic (H1N1PDM09 Virus)." 2019. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention. June 11. https://www.cdc.gov/flu/pandemic-resources/2009-h1n1-pandemic.html.

Health Organization and other countries created a guide to monitor pandemic risk. The guide was set to help nations determine potential threat levels of emerging diseases. The guide consists of five "pre-pandemic" phases that include animal and human incidence of illness and ends in a sixth phase representing a full pandemic.

Due to their guide, the World Health Organization quickly established the H1N1 virus as a phase 5 pandemic. Phase 5 is when "the same identified virus has caused sustained community-level outbreaks in two or more countries in one WHO region."[48] However, WHO eventually raised the level to phase 6 because it spread to multiple countries. WHO asked nations to stop reporting cases during the spread claiming the reports weren't accurate. Further, WHO did not restrict regular travel or closure of borders; instead, they urged sick individuals to avoid travel. Those that did travel between the United States and Mexico were checked for any visible signs of illness and sent to The Centers for Disease Control and Prevention (CDC) quarantine stations. The CDC did help ease the pandemic by giving guidance to the general public, medical professionals, travelers, affected schools, and communities. Due to the CDC's advice, many schools closed to limit the spread of H1N1. The CDC took the initiative in monitoring the number of cases since WHO decided it wasn't important. Fortunately, two antiviral drugs worked against illnesses caused by H1N1 and began being produced and distributed to the general population.

These drugs bought the United States time to expedite the development of a vaccine that would work against this new strain. However, the vaccine wouldn't reach the public until November, after the number of cases had peaked. Developing an effective vaccine and being approved by the FDA can be a long process. Fortunately, due to previous experience with

[48] Bartolotti, Charles R. 2010. *The H1N1 Influenza Pandemic of 2009*. 6.

influenza, creating a vaccine and approval took a few months. The government understood the steps it took to develop a flu vaccine, the clinical trials, and how to report the findings to the FDA. Once the FDA approved the vaccine, the United States focused on mass-producing vaccines and making them available to the public through a vaccine campaign. The United States government was estimated to spend $7.65 billion on purchasing the vaccine and planning the campaign.[49] The federal government based vaccine distribution on the population and size of states. Once states received the vaccine, they developed their own plan to distribute the vaccine. However, states were advised to focus the vaccine on priority groups like pregnant women, people living with infants, children, young adults, etc. Despite all that the government did, there was still room to grow.

The H1N1 pandemic was a learning experience for the world, specifically for the United States government, WHO, and CDC. Considering how the United States government and WHO approached the H1N1 pandemic, one can suggest that they didn't think it was a major threat because its mortality rate wasn't as high as other viruses or diseases. The George W. Bush Administration created multiple influenza pandemic preparedness documents due to concern about the H5N1 avian flu. However, their decision to keep borders open, relying on antiviral drugs while waiting for an effective vaccine, showed that they didn't fully follow the plans. For example, the *Interim Pre-pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States–Early Targeted Layered use of Non- Pharmaceutical Interventions* gave guidance regarding social distancing.[50] Still, there was no focus on social distancing during the pandemic, as people were allowed to continue their daily lives and were only urged to quarantine when there were apparent symptoms. The H1N1 pandemic prompted

[49] Ibid., 15.
[50] Ibid., 27.

the United States government to create a complex, multi-faceted, and long-term plan for future pandemics.

As a result of H1N1, the Centers for Disease Control and Prevention focused on global preparedness and International Health Regulation compliance by coordinating with multiple stakeholders. The CDC did things like establishing the Ministry of Health, country offices, and agency programs. The changes in CDC proved somewhat successful when it came to the Ebola outbreak in 2014. To mitigate the Ebola outbreak, the CDC sent staff to affected countries. They did "laboratory testing, risk-reduction communications, improvements in infection control, and research on risk factors for transmission, viral persistence, and an Ebola vaccine." They established rapid response teams of trained staff to send out whenever threatening diseases like Zika or yellow fever started spreading. The CDC proved itself in many instances outside of the Ebola outbreak.

The Centers for Disease Control and Prevention played a massive role throughout the pandemic. In the hard times of COVID-19, everyone looked at the CDC for guidance. The United States government and its citizens kept a close eye on anything published by the CDC and were sure to follow their instructions. Though some didn't agree with everything recommended by the CDC, an overwhelming amount of the population obeyed the CDC. At the beginning of 2020, our knowledge about the COVID-19 variant was minimal; thus, the CDC could only make suggestions based on their limited knowledge. It was only known that COVID-19 originated in China at the early stages, but as time passed, more cases were popping up in different countries. Eventually, COVID-19 was in the United States, and because COVID tests were limited, the number of cases seemed small. Despite the limited knowledge about COVID, the CDC decided to encourage universal face mask use, maintaining physical distance from other

persons, limiting in-person contacts, and quarantining. These initial steps would allow the CDC and other health organizations to learn about the new disease and create a plan to combat it.

The CDC reacted quickly because they followed previously established MERS-CoV preparedness plans for developing tests and managing cases. These plans proposed a checklist on how to handle cases. The checklist was excessively precautionary, advising healthcare providers and facilities on how to approach potentially sick individuals. Healthcare providers were told to constantly be updated on symptoms, be alert of any possible symptoms in their patients, learn how to report cases, and suggest isolation. Healthcare facilities were instructed to prepare for a large number of patients, create plans to prepare for any unforeseen event, and upon a long checklist of other ways to prepare. The CDC took this plan and applied it to their approach toward COVID. They began screening individuals flying from China, created a team to assist with contact tracing efforts, and activated their Emergency Response System. Over time, as the CDC gained more understanding about COVID, they could create more detailed and specific responses.

The United States' experience with diseases allowed them to make plans on how we could deal with a potential disease like COVID-19. There are many resources and suggestions as to how to approach infectious diseases. In 2005, the World Health Organization created a six-phase pandemic scale and revised the International Health Regulations, a legally binding international treaty. This directly resulted from the 2002–2003 severe acute respiratory syndrome (SARS) coronavirus outbreak. The World Health Organization lays out a series of goals, actions, and policy decisions for each stage in its scale. The World Health Organization does this in five different main actions: (1)planning and coordination, (2)situation monitoring and assessment, (3) communications, (4)reducing the spread of the disease, (5)continuity of health care

provisioning.[51] Many of the actions taken in the different phases can be tailored to fit the epidemiological and sociopolitical characteristics. Nevertheless, WHO isn't the only one that released a detailed plan on how best to prepare for a pandemic.

The Ebola outbreak of 2014 prompted the Obama Administration to focus on developing a guide on how to respond to emerging infectious diseases. The name of the leaked PowerPoint was "Playbook for Early Response to High-Consequence Emerging Infectious Disease Threats and Biological Incidents." According to the Playbook, its purpose is to create "a decision-making tool that identifies: (1) questions to ask; (2) agency counterparts to consult for answers to each; and (3) key decisions which may require deliberation through the Presidential Policy Directive (PPD)-1 process or its successor National Security Council process."[52] The Playbook is composed of two parts; one discusses how to act when the disease has not reached the United States, and the other discusses how to act when the disease is already in the US. Each section has an extended descriptive rubric that lists important questions and decisions. Like WHO, the Obama Administration made this with the intention that whoever is in office would mold the suggested steps to fit the situation best.

Regarding the COVID-19, there have been many occasions when the government has improved its approach toward pandemics since H1N1. Though the response time was slow, once world governments established the severity of the Coronavirus, there were rapid changes to everyday life. The world quickly established how the virus spread because it would help determine what steps to take next. Like the flu, COVID spreads through droplets or smaller virus particles from a sick person or touches a surface with viruses and then touches their face. In the

[51] World Health Organization. 2005. WHO global influenza preparedness plan: the role of WHO and recommendations for national measures before and during pandemics. *World Health Organization*. 2.
[52] "Playbook for Early Response to High-Consequence Emerging Infectious Disease Threats and Biological Incidents." 2014. United States Government. 2.

first few months, the world noticed how intense the Coronavirus was compared to H1N1. Not only did it spread fast, but people would get sicker. Unlike with H1N1, there was an immediate travel ban followed by lockdowns.

The first months of the COVID-19 pandemic were met with fear of becoming infected with the Coronavirus. Since there was no effective diagnostic test for COVID, cases were a widespread public concern. A majority of U.S. residents wanted to test themselves but couldn't find access. People could only check if they were contaminated by matching their illnesses off a list of symptoms. The self-reporting method wasn't an effective way to test for COVID since it would take up to two weeks to show symptoms of COVID, and sometimes, individuals wouldn't show signs at all. Tests became more accessible after late February when the FDA eased its restrictions on Emergency Use Authorization, which led to a rapid increase in the number of authorized tests. The approved anti-body test has a healthcare professional insert a long nasal swab into the nostril and takes fluid from your nose's back. Though testing was now available, the public faced long testing lines, an uncomfortable testing process, and a week waiting period to discover their results. The waiting period for COVID results depended on the demand for testing. When the public started mass testing, laboratories became overwhelmed with tests, which took longer to uncover individuals' results. Fortunately, over time the anti-body and PCR testing process became better. Testing stations were more common, and individuals only had to wait no more than a day.

The rapid spread of the COVID-19 pandemic brought an unprecedented struggle to multiple countries regarding the capacity of hospitals to admit patients during the crisis. From our previous experience with pandemics, there have been multiple pandemic preparedness plans that detail the need for hospitals to have a plan on the occasion they need to receive a large influx

of patients. Despite the plans created, the spread of COVID placed a large amount of pressure on hospitals and health care providers. At the height of the pandemic, hospitals were forced to refuse patients because many had reached their limits. It came to a point where hospitals would choose which patients to take over others. Though some hospitals were at their physical limit, others didn't have enough medical devices to treat their patients. The COVID-19 virus affects the lungs and causes many individuals to require ventilators. However, the United States did not have enough ventilators to treat the thousands of individuals that needed them. This increased the probability of individuals becoming sicker and possibly dying.

Hospitals lacked medical devices, but they also lacked enough protective gear for their staff. Protective gear included respirators, gloves, face shields, gowns, and hand sanitizer. This lack of adequate protection led to high rates of infection and even deaths among healthcare workers. The shortage in medical devices and protection was due to supply chain issues. The major producers of face masks couldn't produce as many due to lockdowns and sick workers. Additionally, the high demand and low supply meant countries were fighting for masks. Fortunately, the Defense Production Act (DPA) allowed the Trump administration to instruct private corporations to produce equipment needed for a national emergency. The DPA was an attempt at closing the gap on ventilators. However, to ensure maximum efficiency, the government would need to demand other industries produce ventilators. For example, the automakers industry would've been a good choice to use to produce ventilators because they had the capacity to boost supply.[53]

[53] Ranney, Megan L., Valerie Griffeth, and Ashish K. Jha. 2020. "Critical Supply Shortages — the Need for Ventilators and Personal Protective Equipment during the COVID-19 Pandemic." New England Journal of Medicine 382 (18).

The DPA was able to save thousands, if not millions, of individuals. However, if there had been proper action at the beginning of the COVID-19 pandemic, there would've been no need to use this act. The use of the DPA was a last-minute effort for the Trump administration to save U.S. citizens. Still, many people could've been saved if they had focused on producing enough protective gear and medical machinery early into the pandemic. In pandemic preparedness plans, there is a stress on having the appropriate medical equipment and ensuring that there is enough for a prolonged period. The U.S. government failed to ensure they had a secure production of medical equipment and protective gear; instead, they relied on other countries to produce these items, and when they weren't able to deliver, it caused massive issues. Thus, it was essential for the U.S. government to begin producing medical equipment and protective gear a few months into the pandemic to avoid having a shortage.

Despite having a multitude of sources from which to learn and prepare for a potential pandemic, the approach ultimately relies on the presidential administration. The COVID-19 pandemic started during the Trump Administration. The Trump Administration had been downplaying the threat a disease can play in society since before they came to know of the existence of COVID-19. During Trump's presidency, he took multiple steps to dismantle government-spending programs that would fight the spread of global diseases. Some of these actions included not replacing the national security official handling pandemics when they left office and disbanding the Global Health Security unit of the National Security Council. The disbandment was a mix of people leaving their position and others being moved to other units. Nevertheless, the disbandment combined with the departure of a senior-level response coordinator could be a potential reason why the response to COVID-19 was slow. The COVID-19 virus is reported to have been noticed as a potential threat by many countries since 2019.

However, until March 2020, the United States government did little to prevent the virus from getting into the country. This showed the administration ignored the Obamas Playbook, which had details on what to do when the disease is not yet in the United States. Nevertheless, COVID-19 had detrimental effects to even countries that prepared and did everything they could to minimize the virus' effects; thus, we must analyze what the US government did and learn for the future.

Chapter 5. Planning for Future Diseases

After all the damage COVID-19 and other infectious diseases have caused, we must look at what we did and learn to prepare for the future. Though the government had a massive influence on how the pandemic played out, it is essential we look at other social factors that affected or were affected by the pandemic. This chapter will review how we can improve social structures to mold a better and more equal society in a series of subsections. It will touch upon various topics such as the economy, education, and social justice. There are different ways to approach this matter, but first, we must remember that ecological problems caused by humans heavily influence the development and spread of infectious diseases. Thus, before focusing on improving government policies, there must be considerate towards our treatment of the planet.

Environmental Policies

The process of creating environmental policies is extremely lucrative. First, there is "agenda-setting," which examines the public's attention towards the issue and how public events grab the attention of politicians. An example would be the Climate March in September 2021. This event was all over the news and big enough to catch the attention of politicians. Next comes policy formulations in which different policies are discussed to come to a final solution. Once the

politicians finish formulating the policy, the law is passed, and it begins to be implemented by agencies/institutions responsible for ensuring this regulation is happening. Finally comes policy evaluation, which essentially questions whether the law works. Nevertheless, there needs to be consideration towards how the policy will impact people's lives. As discussed in Chapter 2, the economy was severely affected during the pandemic, making it an important point to consider because it heavily influences how we treat the Earth's natural environment. Finally, the economy also influences social life, bringing to light another issue that government policies can slightly manage.

Our focus on the economy is one of the many reasons we have destroyed the environment. Though we already depend on species and ecosystems to provide us with food and ecosystem services to survive, we changed this transaction, and now we exploit the environment for our economic benefit. In order for to keep the Earth livable, we must preserve the remaining biodiversity hotspots and sustain the Earth's ecosystem services. Learning from the environment is important and paying attention to what works and what does not. By studying the environment, scientists have found that sustainability is about learning from and utilizing nature's natural processes that have sustained life on Earth through solar energy, biodiversity, and chemical cycling. Some sustainability principles include implementing full-cost pricing, striving for win-win solutions in which most people benefit, and acknowledging our responsibility to future generations.

The government plays a vital role in shifting into more sustainable societies because it can create agencies and policies to help with environmental sustainability. Global governments have made many attempts to work together in creating environmental laws to lighten our impact on the environment. An example is the Kyoto Protocol, an international climate negotiation in

which delegates from 161 nations negotiated about slowing atmospheric warming and climate disruptions. Despite the intentions, the Kyoto protocol wasn't successful because the atmosphere continued to heat up. Nevertheless, when it comes to slowing down climate change, our most urgent priority is to avoid any climate change tipping points. These tipping points accelerate the changes in climate. For example, if we continue to add CO2 to the atmosphere at the current rate, we will likely exceed the estimated tipping point marked by 450 ppm of atmospheric CO2 within a few decades.

Another way to mitigate climate change is through government funding of programs like geoengineering. Geoengineering schemes are plans by which scientists can influence the greenhouse effect to preserve the atmosphere and to improve the climate on Earth. An example of geoengineering is the introduction of large amounts of iron into the oceans to allow the algae to develop and store CO2, and when they die, they would carry it to the bottom of the ocean. Practices like geoengineering are more natural and don’t strain the environment as much as other climate practices. Overall, to lessen the development and spread of future infectious diseases, we must focus on a sustainable lifestyle and policies that reduce our impact on the environment.

The government plays a vital role in shifting into more sustainable societies because it can encourage sustainable economic activity through policy. One of the more discussed policies is cap-and-trade, which has a political advantage over taxes. Cap-and-trade involves the government establishing a maximum on how much companies can emit, but companies that emit less can sell their remaining balance to other companies. This method of mitigating climate change has many advantages and disadvantages. First, there are some records of success, it allows strict legal limits on emissions, and consumers aren't affected. On the other hand, it is challenging to manage because there are so many different emitters of greenhouse gases. Further,

it allows rich polluters will pollute as they polluted before, and carbon doesn't have a set price making it hard to predict the revenue.

Economic Policies

Other than focusing the economy and society on working towards sustainable practices, we should form the economy not to be affected by a pandemic. As discussed in Chapter 2, the COVID-19 pandemic had a massive impact on the global economy, nearing a global recession. COVID-19 negatively affected the global economy by reshaping supply chains. Globalization has rendered our supply chains more complex because countries rely on each other for specific products. The COVID-19 pandemic showed our current economic system's problems, which graciously allows us to think of a way to fix them. Before COVID-19, we had an 'extract-produce-use-dump' economic model, which entails taking the resources out of the environment to produce a product that will be used a handful of times before going to a landfill. Economists recommend changing to a circular economy, as it promotes sustainability and more flexible conditions.

Unlike the current economic system, a circular economy would allow countries to rely less on others when it comes to production, which prevents a major economic collapse like we saw during COVID-19. A circular economy is "an industrial economic model that satisfies the multiple roles of decoupling of economic growth from resource consumption, waste management and wealth creation."[54] In other words, corporations and consumers are encouraged to reduce their waste and reuse their products instead of sending them to landfills. The benefits of a circular economy are that it encourages environmentally conscious manufacturing, promotes

[54] Ibn-Mohammed, T., K.B. Mustapha, J. Godsell, Z. Adamu, K.A. Babatunde, D.D. Akintade, A. Acquaye, et al. 2021. “A Critical Analysis of the Impacts of Covid-19 on the Global Economy and Ecosystems and Opportunities for Circular Economy Strategies.” Resources, Conservation and Recycling 164: 2

avoiding degrading the environment, and shifts the focus to a cradle-to-cradle life cycle. The environmental aspect of a circle economy benefits climate change, in the long run, contributing to a potential decrease in infectious diseases. On the other hand, a circular economy provides the flexibility for an optimized cycle that will work better during a pandemic. For example, designing products for longevity and optimizing for a cycle of disassembly and reuse, reduces bulk shopping and reduces companies from extracting more from the ecosystem.

Unfortunately, shifting to a circular economy is a long process. The ways we produce things completely change in a circular economy because products are designed for the environment and not for the consumer. There are four rules for producing in a circular economy. First, the products must be designed with industrial materials that can be recycled without loss in performance. Second, the products must use natural materials that can be fully returned to the earth's natural cycles. Third, the products must not produce unnatural or toxic material. Finally, design with clean, renewable sources of energy. These rules focus mainly on the materials used and ensuring the environment isn't polluted or exposed to harmful toxins. Additionally, a circular economy requires a strict production process to ensure the best environmentally friendly products.

First in the production process comes product planning. In other words, product planning means setting an agenda that entails identifying external and internal drivers of environmental designs, setting environmental goals for the product, and selecting a team knowledgeable about the environment in ways like engineering or economy. Next comes concept development which is used to identify potential environmental impacts and set environmental safety guidelines. This step allows the producer to consider the long-term impacts and change any designs early on before any damage can occur. After establishing the concept, comes system-level design in

which the producer applies guidelines to the initial design. Producers can use the safety guidelines to select permitted materials in the system-level design phases. Next comes assessing environmental impacts and comparing the initial goals to refine the final product. We mainly based the environmental impact on the materials used to create the product. Finally, the production process finishes with process implementation, reflecting on the process and results. In a circular economy, it would be helpful to limit the choice of consumers to sustainable products.[55] Despite all the planning that goes into creating a product viable for a circular economy, there will be unforeseen outcomes, so we must constantly monitor all the uses of products.

Other than focusing on the environment, we must focus our economy on helping low-income marginalized communities. Before the COVID-19 pandemic, American society was already profoundly unequal. However, the COVID-19 pandemic spread and deepened along the fissures of that inequality many of these individuals experience. As mentioned previously, millions of Americans experienced a change in their income due to the pandemic resulting in many slipping into poverty. A study found that there was a 2.7% increase in poverty when there were no government programs.[56] If the United States does not address the economic inequality occurring, the health and well-being of the nation are at risk. The United States is in dire need of a long-term economic policy that rejects years of injustice, encourages the general welfare, and builds social programs that lift society from below.

As mentioned in Chapter 2, the lives of millions of people changed due to the collapse of economic activity. Millions of people became unemployed within a few months. These low-

[55] Helen Kopnina, and Kim Poldner. 2022. *Circular Economy : Challenges and Opportunities for Ethical and Sustainable Business.* Abingdon, Oxon: Routledge. 88.
[56] Han, Jeehoon. 2020. *Income and Poverty in the COVID-19 Pandemic.* [Electronic Resource]. National Bureau of Economic Research. 14.

income workers were not paid enough to have emergency savings, let alone enough money for a long pandemic. Many of the jobs these individuals had lacked paid sick leave, medical leave, and health insurance benefits. Families that were lucky enough to be employed lacked access to affordable quality child care, forcing many parents or guardians to stay home to care for children. This inequality results from hundreds of policies that determine who would benefit from economic growth. Hence, what needs to change is who benefits from these policies. We need to establish safety net programs and federal aid for state and local governments in a time of increased need. Stimulus bills like The Coronavirus Aid, Relief, and Economic Security (CARES) Act which provided $1,200 per adult and $500 per child during the COVID-19 pandemic, are ineffective. The CARES Act is a failed attempt of a policy to help bring us out of struggles because it is not enough. Instead, we need to focus on having livable wages and bringing unemployment rates down. Additionally, reform unemployment insurance to make them more beneficial for those in need. There should be insurance for those with jobs to keep workers healthy and provide a reliable form of universal healthcare. The Affordable Care Act (ACA) has laid the foundation for these efforts. Policymakers should focus that everyone is equal and develop an economy where everyone can benefit, not just the rich.

Educational Policies

Environmental education is an essential feature of global sustainable development. Education is recognized for its role in developing and advancing societies worldwide. Quality education allows more individuals to participate in global politics and economics. Environmental education encourages people to make knowledgeable and informed decisions about their environmental behavior based on the awareness, knowledge, skills, and attitudes instilled in them. This section provides how we can benefit current and future generations by educating

them on environmental issues through the Theory of Change. The Theory of Change is "a diagram and narrative explaining how program activities lead to program outcomes."[57] In other words, the belief that we can make a profound change in people's way of thinking and the environment through education. This theory allows people to develop a program curated to their situation to allow the best outcome. Early environmental education can familiarize people with sustainable habits and slowly improve how we treat the environment.

There has already been an attempt to incorporate environmental education in global school systems through *Agenda 21*. In 1992, the Rio Summit produced *Agenda 21*, an international agreement to address sustainable development worldwide by increasing community participation in addressing environmental, social, and economic concerns that affect their community. In *Agenda 21,* 178 countries agreed that to accomplish these objectives "... [there is] the need for individuals, groups and organizations to directly participate in environmental impact assessments and to know about and participate in decisions which potentially affect the communities in which they live and work."[58] Nevertheless, properly educating a nation is a long process, as there needs to be consideration of the range of knowledge of the citizens. All governments and teachers need to understand how to approach different populations based on their concerns. Despite the optimistic intention of *Agenda 21*, it received mixed reviews. First, it was not a treaty, and thus, there were no penalties for nations that didn't follow through. Next, people felt it was an attempt by the government to remove people's freedoms because some felt forced to think in a specific way. Finally, environmental activists supported the idea of spreading

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[57] Krasny, Marianne E. 2020. *Advancing Environmental Education Practice.* Ithaca: Cornell University Press, 15.

[58] United Nations Conference on Environment and Development. 1992. *Agenda 21, Rio Declaration, Forest Principles*. [New York]: United Nations.

environmental knowledge for change. Learning from plans like *Agenda 21,* we can develop better education plans that cater to different people.

A national education plan has to take into account the different background of its citizens. The United States has millions of people with different levels of education. There are two ways to approach environmental education. The first approach is through early exposure. This includes incorporating environmental issues in early education through different activities. Early environmental education allows children to develop consciousness concerning their environmental behaviors. Environmental behaviors are "any actions taken by an individual or a group that benefit the natural environment, enhance environmental quality, or promote the sustainable use of natural resources."[59] An example of this is when children are taught to recycle plastics and paper. When taught to recycle in the classroom, children become conscious of their choices in the real world. Hence, it is beneficial to introduce children to sustainable habits and the environmental consequences of creating bad practices. On the other hand, the second approach is more difficult as it involves changing adults' habits and ways of thinking.

Unlike children who have moldable minds, adults have already established a way of thinking that makes it difficult to accept different ideas. It is vital we encourage sustainable habits by everyone because political action through policy is not the only solution. Though corporations make up the largest portion of environmental destructors, the consumers must also be knowledgeable about their impacts on the overall harm to the environment. Frequently, individuals comprehend that their choices harm the environment, but they choose to continue their habits because it's "nothing compared to big corporations." This shows that the general public has environmental consciousness but has lost hope in feeling powerful enough to make a

[59] Krasny, Marianne E. 2020. *Advancing Environmental Education Practice.* 54.

change. Nevertheless, to change this mindset, we must introduce information in a manageable way. There are different ways to approach it including leisure learning courses, art-making workshops, held in community centers, church basements, or other informal sites. We can also build on general knowledge of environmental issues and increase discourse about the environment. This approach allows people to speak about their experiences and learn about others' experiences; it allows people to develop empathy for each other and future generations. Overall, adults shouldn't feel forced to change their mindset but naturally motivated to better themselves and the world.

Overall, we must recognize the influence climate change has on our experience. Though there are various direct effects of climate change on things like temperature, precipitation patterns, sea levels rising, etc., there are also indirect effects that we don't consider. An indirect effect of climate change is increasing insect outbreaks and infectious diseases. The public views the emergence of diseases as naturally occurring and unstoppable events. However, if humans continue to destroy the environment and climate change continues to advance, there will be a noticeable increase in diseases, and everyday life will change. As this paper demonstrated, there will be significant economic change and social change. People will have to adapt to a new way of living that does not seem ideal for many. Thus, we must focus on global environmental change in which we create policies that protect the environment through individual and industrial actions.

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