

Lesson 15: Climate Change

Laura McKinney

Global climate change is perhaps the most daunting ecological crisis facing all of humanity. The virtual scientific consensus on the anthropogenic (human-caused) basis of climate change indicts our reliance on carbon-intensive industrial production practices (see Lesson 7), non-renewable energy sources (see Lesson 9), and industrialized agriculture (see Lesson 12), among other dynamics, as altering the propitious balance of atmospheric gases we depend on to protect us from the sun. In the absence of drastic and sustained action, emissions of a broad range of greenhouse gases (GHGs) are predicted to result in a change of 2 degrees Celsius by 2050, with dire consequences for all species, including humankind. Recent reports from the Intergovernmental Panel on Climate Change (IPCC) warns that without aggressive action we will begin to experience catastrophic effects as early as 2040. Left entirely unchecked, current emissions rates are predicted to lead to warming in excess of 4 degrees Celsius, with abysmal ramifications for the planet's capacity to support human populations. Disruptions to food chains, frequent floods, prolonged droughts, intense hurricanes, severe wildfires, and the disappearance of entire communities due to sea level rise are just a few examples of the consequences that accompany climate change, many of which we have begun to experience and all of which will surely worsen. Even in the "best case" scenario, warming of 2 degrees Celsius will have profound impacts on humanity, and staying below the 2 degrees threshold requires major departures from current trends in development, production, and consumption that infiltrate nearly every facet of life.

As you read through this lesson, I ask you to consider a few questions: How often do you think about climate change? Do you worry about the consequences for you and your loved ones?

Do you think governmental, institutional, individual, or international efforts (or any combination) to reduce emissions are fruitful avenues to address the root causes of climate change? To what degree does concern for climate change shape your lifestyle choices? Do you bike, take public transportation, cut down on meat consumption, avoid plastics, or reduce air travel to curtail emissions? What are the challenges or barriers to doing so? Do you participate in social movements to bring attention to this problem? Have you joined divestment campaigns to cut university ties to the fossil fuel industry? How concerned are you about the future in the face of changing climates? How does the information you possess about climate change shape your hopes and dreams for the future? How heavily do environmental concerns weigh into your support for political candidates or other community-based efforts to confront the drivers of climate change? Do you feel climate change has been unfairly foisted upon your generation by those who precede you?

It is likely that most of you have thought quite a bit about the questions posed above; perhaps some of you ponder these questions nearly every day in some form. If so, you are in good company as the mass protest executed on March 15, 2019, spurred youth from more than 100 countries around the globe to skip class and take to the streets to demand action on climate change. It was a stark display of alarm and awareness that your generation and those that follow will be forced to reckon with the damage to the atmosphere that is causing climate change and its effects on biodiversity, food production, and vulnerability to disasters, just to name a few. For many, this knowledge brings feelings of anxiety, uncertainty, fear, doubt, and even indignant outrage at the unfairness of it all. To be sure, your life course will occur under circumstances that older generations are privileged not to have encountered or factored in when making major life

decisions, as your ability to live and thrive is under assault given our current trajectory towards global warming and all that it entails.

The purpose of this lesson is to provide an overview of a sociological approach to understanding climate change dynamics. You will find baseline information on the causes and consequences of climate change and how incorporation of a sociological imagination augments our understanding of these topics. Applying the arsenal of sociological theories to the topic of climate change requires rigorous attention to the inequalities surrounding its causes and effects, which include disparities at the inter- and intranational levels. The chapter ends with a discussion of current efforts to address and deny climate change, the political landscapes that serve as backdrops to both, and possibilities for future alternatives.

Causes and Consequences of Climate Change

Scientists discovered in the 19th century that certain gases in the air trap heat that would otherwise escape into space. Carbon dioxide was identified as a key player, and further research confirmed the warming potential of additional gases including methane and nitrous oxide. The greenhouse effect is the term used to refer to this process. As early as 1896 scientists predicted global warming would result as humans released carbon dioxide into the atmosphere. Currently, the presence of carbon dioxide in the atmosphere is about 43% greater than pre-Industrial levels, and global warming trends track at about the rate scientists predicted it would. Despite scientific consensus, those who profit from the current system engage in myriad politically-motivated efforts to deny, obfuscate, and derail widespread acceptance of knowledge about the scientific evidence substantiating global warming and the role of industrial processes in exacerbating it (see Lesson 6). Efforts range from campaigns to discredit the scientific basis of climate change and questioning the “natural” rhythms of changing climates to the more outrageous—for

instance, President Trump has gone so far as to allege a worldwide hoax concocted by scientists to fool the public. The absurdity of his and other equally outlandish assertions has caused some oil and gas companies to distance themselves publicly, though they continue to finance misinformation campaigns and politicians who espouse climate denial. Similar to the tobacco industry's interest in denying linkages between cigarettes and cancer, oil and gas industry titans invest heavily to manage public discourse and thwart citizen outrage regarding the existence and causes of climate change. Unfortunately, efforts to undermine the legitimacy of climate science have gained traction among some segments of the population, particularly in areas with historical reliance on jobs in oil, gas, and coal production.

Scientists also overwhelmingly agree that we are in big trouble. The 2018 IPCC report paints a dire portrait of the immediacy and severity of climate change consequences, concluding that effectively addressing this crisis requires transformations at a scope and scale that have “no documented historic precedent.” In tandem with the National Climate Assessment released the same year, these warnings are the starkest to date in detailing the economic and humanitarian crises caused by global warming. Water scarcity, torrential downpours, severe heat waves, unrelenting wildfires, agricultural disruptions, and coastal flooding are just a few of the life-threatening consequences identified by these agencies. In as little as two to three decades, scientists agree we will encounter dismal effects with greater frequency and magnitude, including the occurrence disasters (floods, droughts, wildfires, hurricanes) and erratic weather patterns (intense heat waves, heavier rainstorms) that threaten subsistence and disrupt the many benefits that flow to humans from healthy ecosystems. Climate change has resulted in the loss of coral reefs (with mass die off expected as soon as 2040) and other fragile habitats, posing major threats to biodiversity. According to the International Union for Conservation of Nature (IUCN),

more than 27% of all assessed species (i.e., more than 26,500 species) are threatened with extinction, a trend that is expected to worsen as climate change intensifies. Experts also agree sea level rise will accelerate and many believe a rise of 15-20 feet is inevitable, which will be catastrophic for coastal communities and low-lying nations.

One effective ecological check against emissions is carbon sequestration via photosynthesis, as we all know that plants and trees absorb carbon dioxide and return to us clean oxygen. However, the **carbon sequestration** capacities of existing forestlands are unable to keep up with global emissions rates. Moreover, the appropriation of forestland for corporate uses—such as converting the Amazon to grazing land to meet American demands for cheap beef—is an unfortunate and commonplace scenario that further undermines our capacity for carbon uptake. Another example that has garnered mainstream attention is the conversion of rainforests in the Philippines to palm oil plantations that eliminates their sequestration potential, with companion adversities on biodiversity and water resources as well as displacement of rural and indigenous farmers and the virtual annihilation of their livelihood strategies.

While climate science has rapidly formalized into a burgeoning area of scientific inquiry, leading publications continue to be focused more on the physical and biological properties of earth systems than on inequities in human development and pathways of modernity between, within, and across nations. There is widespread agreement that confronting climate change requires comprehensive assessments of interactions among economic, social, and environmental systems and their intersection with uneven human development. Our current challenge is to understand the complex inequalities surrounding global environmental change. Sociology brings a magnitude of scope and scale necessary to analyze the broader social forces in which **sustainability** dynamics are thoroughly embedded.

Theoretical Approaches to Environmental Impact

Spurred by growing awareness of ecological constraints, sociologists have increasingly begun to incorporate environmental concerns. Social responses to environmental threats, such as banning the use of DDT, and growing recognition of the delicate balance of flows between nature and society prompted sociologists to focus on the environment. The subfield of environmental sociology has grown into a burgeoning area within the discipline, a trend that is near certain to continue. Climate change has solidified the importance of sociological examinations of ecological crises as we endeavor to understand the large-scale, structural forces driving global warming. In fact, the American Sociological Association recently convened a task force to produce an edited volume on global climate change. Sociological theories and methods have earned sure footing in scientific approaches to understanding the causes and effects of climate change, as well as informing strategies to mitigate those trends, as elaborated below.

Human Ecology: IPAT, POET, and Ecological Modernization Theory

At its origins, human ecology emerged as a central approach to understanding nature—society interactions within environmental sociology. The IPAT formula represents a chief contribution of the human ecology framework that posits environmental impacts (I) are the multiplicative function of population (P), affluence (A), and technology (T). Rooted in Malthusian concerns that (geometric) population growth would outpace (arithmetic) gains in agricultural production (see Lesson 8), leading to population “checks,” such as war, famine, and disease, the IPAT framework captures the variations of environmental impacts emanating from people, their consumption demands, and advances in technology. Empirical examinations have tied population and/or affluence to deforestation, carbon dioxide emissions, and methane emissions, all critical drivers of climate change. An important lesson emerging from these

studies is that the effect of population size and growth is only meaningful when considered in tandem with affluence and consumption.

The POET model is a closely related perspective that identifies interdependencies among population (P), social organization (O), and technology (T), while maintaining that all three are key causes of environmental problems (E), as well as bring consequences of one another and of the environment itself. POET's holistic approach provides a useful framework for examining societal-environmental interactions. The introduction of the "O" term for organization is particularly important in any effort to understand environmental dynamics. A newer human ecology approach to environmental impact articulated additional insights about the importance of culture and social change. These "new human ecologists" maintained the Dominant Western Worldview (DWW) of the Human Exceptionalist Paradigm (HEP) was being supplanted by the New Ecological Paradigm (NEP), which was a greening of values. This rational awareness of the interdependence of humans and nature is viewed as an important mechanism for reversing the harmful impacts of population, affluence, and technology. In principle, a national modernization of values emerging from societal organization and institutions can help overcome the environmental effects of modernity.

Ecological modernization theory (EMT) relatedly offers the process of development has the potential to improve the environment. EMT posits that with modernization, individuals and citizen groups become increasingly "green" in orientation, with positive effects on the environment. The Environmental Kuznets Curve (EKC) shares EMT's optimism, positing a curvilinear (inverted U-shaped) relationship between economic growth and environmental degradation. That is, in the early stages of economic growth, damage to the environment increases to a certain level of per capita income and then the environmental trend reverses itself.

However, EKC has been heavily critiqued for flimsy statistical evidence and failure to situate domestic environmental impacts within the global context of international trade networks. The “Netherlands Fallacy” is a useful tool to illustrate this weakness; it refers to the erroneous conclusion that some nations that appear to be modernizing ecologically are actually shifting negative environmental impacts around the globe.

EMT also focuses on technological innovation and state intervention as plausible strategies for escaping environmental crises. With regards to the former, ecological efficiency is believed to emerge as technology advances, with companion reductions in harmful environmental practices. However, a substantial amount of empirical research fails to support this belief. As the Jevon’s paradox warns (see Lesson 9), energy efficiency tends to increase production and consumption, resulting in more natural resource withdrawals, not less. As for the latter, state intervention is questioned as a viable strategy for addressing environmental threats given the global nature of material flows. Global trade networks enable affluent nations to enact pro-environmental state policies while maintaining high rates of consumption by exporting dirty environmental production. Moreover, economic globalization might encourage a “race to the bottom” among poor nations competing for foreign investors, whereby deregulation is deployed as a tactic to allure multi-national corporations to operate in their jurisdictions. The rollback or removal of safety, labor, and environmental regulations is a major incentive for moving the most environmentally-damaging production activities to disadvantaged locales. Thus, the efficacy of state intervention as a means to check climate change must be vetted vis-à-vis the global context of transnational networks of production and exchange.

World-polity perspectives similarly emphasize that countries tend to conform to world-wide norms as they become incorporated into the global system, with related tendencies to

develop environmental regulations, ministries, and consequent environmental reforms. According to this approach, integration into world society stimulates national participation in environmentally-focused IGOs, NGOs, and international treaties that promote environmental concern and the institutionalization of an “environmental regime,” which fosters favorable environmental advances. The degree to which these reforms are actually undertaken, monitored, and enforced is, however, open to question. Environmentalism may be symbolic, in that many states offer only a superficial compliance with sound environmental policies. It is further unclear whether reforms, if implemented, are effective. Also, environmental values to the contrary, efforts to infuse the logic of **neoliberalism** globally may be an overwhelming and opposing force shaping the economic and environmental activities of all actors in the world system.

Political-Economic Approaches

The political-economic tradition encompasses world-systems theory, treadmill of production, and metabolic rift (see Lesson 2). These approaches are bundled because many of their themes spring from a comparable logic that facilitates a collective articulation. World-systems theory and ecologically unequal exchange perspectives outline the ways in which vast power and wealth differentials influence domestic modernization via the allocation of economic activities, with companion impacts on environmental conditions. These theories assert that domestic development is determined by global structuring of the world economic regime and hierarchy of nations therein with the greatest (economic, military, and political) power and privilege residing in core nations. These approaches postulate an international division of labor relegating the least profitable (i.e., most competitive) production processes to peripheral nations, with the most profitable (i.e., least competitive) business activities confined to core nations, while semiperipheral nations evidence a near even mix of core and peripheral products. The

global hierarchy—maintained and reproduced by policies and programs of international development organizations such as the World Bank, World Trade Organization, and International Monetary Fund—traps peripheral nations in states of relative economic stagnation (or “underdevelopment”) while promoting and reifying core nations’ superior positions of wealth and power.

The allocation of primary (extraction, mining, agriculture) and secondary (industrial, manufacturing) sector production to non-core nations via **offshoring** and outsourcing allows core nations to maintain profligate rates of consumption and relatively in-tact environments (see Lesson 3). Non-core nations siphon raw materials and engage in dirty industrial production for export to core nations, leaving behind marred landscapes and legacies of pollution and toxicity far removed from the locus of demand. These global processes exacerbate ecosystem destruction in peripheral and semiperipheral areas, with major implications for their short-term and long-term sustainability, including vulnerability to climate change. For instance, a recent analysis of more than 4,000 climate-related disasters shows that poor nations experience far higher rates of mortality and homelessness in the wake of climate-related events than do wealthy nations.

Core nations tend to evidence specialization in service sector and high-technology industries (e.g., aerospace engineering), while offshoring the bulk of industrial and manufacturing production processes—and their environmental externalities. Intensification of environmental degradation accompanies this shift in production resulting in land destruction, air pollution, and water contamination in non-core locales. The waste and toxic by-products generated at points of production, transfer, and consumption as well as the disruption to natural ecosystems and depletion of precious resources required to meet core countries’ consumption demands wreaks havoc on the environment. This is consequential because ecological destruction

is tightly connected to climate change adversities, as declines in the quality of the environment erodes natural barriers to disasters (such as wetlands that temper hurricanes) and is directly linked to their occurrence (such as deforestation triggering landslides or extended droughts sparking wildfires).

World-system theorists join Treadmill of Production (TOP) and metabolic rift adherents in arguing that the logic of capitalism requires continuous, intensive, and extensive exploitation (destruction) of nature that can never be re-aligned to be “green” in orientation. TOP theorists focus on the role of energy and chemical intensive technologies in creating greater demand for natural resources, increasing waste streams and chemical toxicity (see Lesson 7). The production treadmill, run by treadmill elites, plays a determinative role in increasing environmental destruction. A particularly instructive insight of the approach is that the movement of US capital abroad has reduced ecological withdrawals and waste additions to some degree within the US but has exacerbated environmental disruptions in the countries to which the capital and waste have been transferred. The capitalist treadmill thus instigates environmental adversities around the world.

Metabolic rift theorists adopt the classical arguments of Marx, especially regarding his concern of “the problem of soil fertility within capitalist agriculture,” the primary ecological crisis of his day, as well as his treatment of issues with deforestation and urban pollution. Capitalism predicated on intense agricultural practices drive soil depletion and the movement of rural dwellers into urban centers where they produce and consume finished products, disturbing the natural metabolic rhythm of interactions between society and nature. Metabolic rift theorists assert the production and consumption trends inherent to the system of capital accumulation depend on the continuous overexploitation of natural resources and disruption of ecological

metabolic processes. Due to the unequal power/dependency relations in the world-system, much of the environmental degradation resulting from current modes of production, accumulation, and consumption are concentrated in less-developed countries. Empirical examinations confirm concentrations of environmental adversities such as deforestation (see Table 1), biodiversity loss, and the accumulation and transfer of hazardous waste in non-core locales.

[Table 1 about here]

[Figure 1 about here]

One exception to this trend is carbon dioxide emissions, which tend to be concentrated in high- and middle-income countries (see Figure 1), due to the global organization of production outlined above. Specifically, the rates at which carbon dioxide gases are emitted as by-products of core production and consumption trends cause an abundance of greenhouse gas emissions within developed nations, making this a chief form of “first world” environmental degradation. It is notable that although the highest rates of carbon dioxide emissions are concentrated in developed nations, the consequences affect people, species, and ecosystems, globally. Disruption to natural metabolic processes, increased toxicity and waste streams stemming from advances in technology and industrialized production (see Lesson 7), and the quest for endless growth and capital accumulation are intrinsic aspects of the system of capital emphasized by metabolic rift, TOP, and world-system perspectives that lead these theorists to conclude our current economic system fundamentally at odds with sustainability.

The treadmill of destruction is a complementary theoretical approach largely inspired by TOP theory but with specific focus on the effect of militarism. Similar to the TOP framework, the treadmill of destruction emphasizes the role of treadmill elites in determining social, political, and economic responses to environmental problems. Treadmill of destruction adds to

this the impacts of the military, highlighting the large withdrawals of natural resources and increased toxicity resulting from military institutions and activities (see Lessons 3 and 7).

Maintaining military apparatuses around the world result in vast consumption of nonrenewable energy and other resources. Moreover, the changing face of war from armed combat to weapons of mass destruction represents a decisive switch in research and development activities, with major implications for the environment. Whereas previous models of armed combat sought to injure enemies, testing, maintaining, and deploying weapons of mass destruction represent efforts to render environments completely uninhabitable. As such, the surge of toxicity and threats to ecology are qualitatively different in the weapons of mass destruction era, making military considerations primary concerns for environmental analyses.

Climate Change, Global Inequality, and Environmental Justice

Global warming dynamics are especially critical considerations for social and environmental justice perspectives (see Lesson 10), as those who contribute the least to climate change are subject to disproportionate concentrations of its adverse effects. **Climate justice** advocates increasingly view climate change as a general human rights issue with particular emphasis on its intersection with race, gender, class, and other existing power inequalities. Across nations, climate change is characterized by severe inequalities in contributions to, benefits from, and consequences of climate change, particularly across global North/South divisions. While the global North has greatly contributed to and benefitted from climate change, it remains the least scathed from its effects. Whereas the global South, in relative terms, has neither contributed to nor benefitted from climate change, but remains most vulnerable to its consequences. This has led many to assert that wealthy, developed countries in the global North (e.g., United States, Canada, Western Europe) owe a great “climate debt” to inhabitants of poor

nations in the global South (e.g., South America, Southeast Asia, Africa) for the social, economic, and ecological crises wrought by climate change.

The global hierarchy of nations figures heavily into the abysmal performance of international efforts to address climate change. Low-lying nations, such as Bangladesh and the Maldives, have strong urgency to halt human activities causing climate change that threaten their very existence but lack, in relative terms, the political sway to mobilize swift action. The relative stagnation, disputed efficacy, and reluctance or outright refusal by some nations to participate in international agreements (e.g., Rio Earth Summit in 1992; Kyoto Protocol in 1997; Conference of Parties (COP) held annually since 1995) seeking global cooperation to reduce emissions are indicative of the vast power and wealth differentials across nations. For example, the Bush administration's refusal to ratify the Kyoto protocol because it was "too costly" was a slap in the face to developing nations. How could the most affluent nation in the world not afford to implement sound environmental policies to address the climate crisis? This is especially insidious given that the United States alone emitted 50% more greenhouse gas emissions in the 20th century than all developing countries combined. The 2009 COP in Copenhagen was exceptionally contentious. Amidst mounting pressure to pay for the climate problem they created, OECD nations promised to provide \$100 billion annually by 2020 to help developing nations cope with climate change. In the absence of standardized accounting methodologies, OECD nations were allowed to decide what they would count as part of their commitment. Follow up reports from the OECD to document progress on upholding their pledge have been heavily critiqued for lack of transparency, flawed estimates, and exaggeration if not blatant falsehoods. Disputes surrounding the accounting procedures remain a point of contention for

developing countries as they await the funding they were promised and continue to rebuke OECD claims of those promises being fulfilled.

There are multiple ways that climate change disproportionately burdens middle- and low-income nations. The economic impacts are predicted to be more drastic due to their geographic clustering around the equator (making them more vulnerable to heatwaves) coupled with their reliance on agriculture and natural resource extraction, both of which are profoundly impacted by erratic weather events. The health risks (see Lessons 10 and 11) are also amplified among low-income populations residing in low latitudes given the co-occurrence of high prevalence and greater vulnerability to climate-sensitive diseases such as malaria. Less-developed and developing nations characteristically lack the capacity to prepare for and respond to various environmental hazards. Individuals in these nations more vulnerable to disasters, which is especially worrisome considering the forecasted increase in severity and frequency of disaster events as a result of climate change. Their capacity to minimize pre-disaster risks and optimize post-disaster recovery is compromised by several factors such as inefficient evacuation strategies, exacerbated bouts of political and economic instability, institutional failures, and general lack of provisions for assistance and aid. Malnutrition is another central concern as climate change threatens to propel millions into chronic states of food insecurity due to food shortages and food price shocks.

There is a wide body of research connecting warming temperatures to various forms of violence ranging from armed conflict and organized crime to self-inflicted and interpersonal violence. In addition to the direct impacts on mortality, collective violence impairs access to critical health resources including sanitation, medical care, health supplies, safe food, and clean water. Yet again, individuals in low-income nations in low latitudes are most vulnerable to

temperature increases, and there is mounting evidence that charts the correspondence of spikes in violence with rising temps. Moreover, these nations are the least prepared in economic and political terms to combat insurgent forces, military coups, or state-led violence. Unfortunately, left unchecked, violent uprisings are expected to become more commonplace as the effects of climate change continue to intensify. Indeed, climate change is indicted as a key factor contributing to the civil war in Syria that has claimed nearly a half million lives, injured nearly 2 million people, displaced almost 7 million individuals, and created nearly 5 million refugees since 2011. The severe drought that plagued Syria from 2006 to 2010 triggered massive migrations to urban centers and food price shocks that exacerbated poverty and social unrest, leading many to attest to the central role of climate change in instigating the humanitarian crisis.

Low income nations also face greater threats to population stability as they are ill-equipped of the political and economic resources needed to manage climate-related crises. They tend to have greater rates of displacement resulting from extreme weather events. Reliance on weather-dependent livelihood systems intensifies pressure to relocate as changes in weather patterns adversely impact the sustainability of their subsistence strategies. The interaction of climate stressors with conflict may prompt substantial movements of people as population shifts compound civil unrest. Long-term deterioration in the habitability of locales could spark massive migrations as heat waves, rising sea levels, desertification, and diminishing freshwater aquifers impede local and regional ecosystems' ability to support human populations.

Climate change, gender, and intersectionality

As demonstrated above, there are vast differences across nations regarding their ability to cope with climate change. Within nations, similar disparities exist. Individuals who occupy positions of power and privilege are less vulnerable to climate change adversities, whereas poor

people will be hit first and hardest. Those at the fringes of society who depend on the environment in the course of their daily lives to fetch food, fuel, fiber and other resources are among the most vulnerable to changing climates. Individuals engaged in subsistence agriculture and livelihoods dependent on natural resource inputs are especially susceptible to climatic changes that threaten their ability to provide for themselves and their households. Indeed, poor, rural, indigenous women are particularly hard hit, as their daily tasks of gathering resources for the household are profoundly complicated by climate change dynamics.

An **intersectionality** framework is a helpful lens for understanding differences in vulnerability to climate change. Intersectional approaches eschew the tendency to focus on singular forms of social difference by emphasizing the complexity of interlocking systems of oppression, including (but not limited to) race, gender, class, sexuality, ethnicity, nationality, indigeneity, (dis)ability, religion, species, and rural/urban as well as global South/North divides. Although intersectionality scholarship did not focus on human-environmental relations at its inception, the approach has been increasingly incorporated into socioecological theories. By examining how numerous axes of difference influence each other, intersectional approaches seek to understand the complex ways in which systems of inequality and privilege “intersect” in individuals’ lives to create different vulnerabilities, opportunities, and outcomes to the same political, economic, and environmental circumstances.

Ecofeminism is one such framework that employs an intersectional lens to illuminate the ways in which women are uniquely positioned in society as an acute sufferer of—and potential savior from—ecological destruction. Ecofeminist scholars assert the structure and logic of the world economic regime is such that large portions of costs associated with production are absorbed by both women and the environment, resulting in their interconnected domination and

exploitation. Ecofeminists utilize an intersectional approach to understand the ways in which individuals experience and interact with the environment, as shaped by the constellation of inequities across racial, gender, class, and colonial divides as well as unequal development trajectories at the local, national, and global levels. This diverse body of work illustrates how social location, privilege, and disadvantage intersect to create very different effects on and experiences of the natural environment within society.

Women differ from men in their relation to the environment in numerous ways; there is accruing evidence that women are uniquely affected by, concerned about, and motivated to act against environmental degradation compared to men. Women's relatively greater concern for environmental issues is theorized to stem in part from the historical forces and cultural contexts that position them as caregivers, subsistence providers, and collectors of resources needed by the household. The activities allocated to women are directly linked to the health of the environment, a dynamic that is especially pronounced in less-developed countries. For example, gathering food and water is complicated by changing climates, erratic weather, and soil infertility. In a world of resource scarcity, women must travel longer distances over increasingly perilous terrain to secure food, fiber, and fuel.

Reduced availability in the quantity and quality of natural resources complicates women's lives in numerous ways, with the worst disadvantages concentrated along predictable lines of colonial, racial, class, wealth, and power divides. As women seek to perform tasks of securing inputs for the household, declines in environmental quality present a growing challenge encountered in their daily lives. Women in poor nations are primarily responsible for subsistence farming; consequently, environmental problems, such as soil infertility and water contamination, impair their ability to provide food for themselves and the household. Women must walk farther

to find clean water when local sources are contaminated or compromised, they have to hoe longer or farther from the home when soils are depleted. The sheer physical taxation of increasingly onerous pursuits for resources imposes direct burdens to women's health. Moreover, the tendency of women to "eat last" potentiates health risks posed by declines in the quality and quantity of available food, amplifying malnutrition and susceptibility to disease among women. Circumstances such as these impede women's ability to nurture the health and well-being of children and the elderly—responsibilities disproportionately assumed by women. For these reasons, the effects extend beyond women's lives with ripple effects on household and community wellbeing.

The amount of time and effort allocated to fulfilling subsistence tasks escalates when local environments are degraded, impinging on women's ability to seek formal employment outside the household with companion reductions in their autonomy and economic stability. The prolonged search for resources also diverts women's time away from educational pursuits that are powerful avenues for advancing their overall status and autonomy. Women are further disadvantaged by ecological degradation insofar as their ability to earn money by engaging in cottage industries is imperiled. The dwindling availability of resources used in handicrafts poses challenges to women who rely on these activities for income. With deeply limited options regarding paid work among women in disadvantaged locales, the additional constriction imposed by resource scarcity exacerbates their already precarious positions in the labor force.

Declines in environmental quality correspond to declines in the status of women, jeopardizing their ability to fulfill traditional roles as caretakers, subsistence providers, and community caregivers. Moreover, ecofeminists posit that resource scarcity accentuates the rigidity of structures of gender inequality as men seek to reify their superior status relative to

women. In other words, when resources are scarce, men seek to maintain authority and privilege over women by preserving uneven access to economic, social, and environmental resources. One way to solidify women's inferiority is the perpetuation of legal policies that prevent women from accessing loans, land, and property that would otherwise improve their autonomy and health.

To illustrate, one case study of land reform in Kenya demonstrates how government-led efforts to adjudicate and register land resulted in policies that conceived ownership as primarily resting with male heads of households, though the vast majority of women were full-time agricultural producers. Without deeds, women were unable to seek loans to improve production or make investments to advance sustainability. In response, a group of women banded together to generate income by weeding for pay; the funds were used to build homes and purchase goats. The goats provided nourishment and the offspring could be sold to cover other household expenses. The women installed irrigation systems to cultivate crops for local consumption, gathered medicinal knowledge to address diseases in the area, and implemented soil and water conservation activities to check soil erosion. This is one example of the spillover benefits generated for local communities when women are granted access and decision-making power to manage land and economic resources.

For these reasons, ecofeminist scholars equally emphasize the ways in which these dynamics make women especially well-suited to advance sustainability. Ecofeminist perspectives offer that women, when afforded positions of power in society, tend to promote environmental stewardship. To the degree that women are granted formal access to and control over economic resources, their ability to address environmental crises is enhanced. Women with access to credit can use funds to protect against disasters, such as structural improvements to homes that can withstand heavy wind and better tolerate downpours. A growing body of

literature emphasizes that revenues earned by women are often used to meet needs that improve public health conditions, such as education fees, healthcare costs, and clean water and sanitation services, compared to wages earned by men. Research also shows women who reside in communities with greater gender equality in economic terms tend to use their bargaining power to promote development projects that benefit their community and region.

Political empowerment across gender lines is another key avenue for improving the environment. The deep connection between women and the environment that has the potential to tip the scales in favor of ecosystem conservation is particularly evident when women are afforded political legitimacy and representation in governing bodies. There is accumulating evidence of beneficial associations between female representation in governing bodies and positive environmental outcomes. Scholars demonstrate that CO₂ emissions are lower in nations where women have higher political status, and that nations with greater female representation in governing bodies have lower climate footprints. Collectively, these results indicate that when women have political power, environmental conditions improve. Thirty percent representation by women is often cited as a critical mass or the point at which women gain power to influence policy. Unfortunately, less than one-quarter of national parliaments meet this target at present. This gap is meaningful because excluding women from decision-making processes does not bode well for altering policies to prevent or curtail ecological destruction. Thus, increasing political participation and representation among women represents a critical pathway for resilience.

One barrier to their political participation is perceived incompatibilities of holding public office with traditional caregiver obligations that are disproportionately allocated to women. Through the lens of intersectionality, some social, cultural, and religious beliefs are especially disdainful of women's entry into public spaces, particularly when doing so conflicts with their

household labor. Abolishing the cultural, political, and social forces that prevent women's participation in the public sphere, then, represents another key avenue for addressing environmental crises.

Responses to Climate Change

In line with the logic outlined above, ecofeminist scholars assert gender equality is a necessary step for effectively addressing environmental crises. Showing particular disdain for techno-scientific solutions to environmental crises, ecofeminist frameworks unmask the political and economic motivations that stall progress towards sustainability. For example, the tendency for environmental crises to be cast as a "population problem" unfairly places blame on female-sexed bodies residing in poor nations while failing to address the disproportionately greater contributions to environmental destruction stemming from capitalist production, Western patterns of consumption, and global corporate practices. Thus, an ecofeminist reading of population concerns uncovers the ways in which efforts to control women's bodies maintain the current global order by deflecting attention away from the true culprits of environmental harm. Others in this tradition reveal that techno-scientific solutions to environmental problems often exacerbate existing inequalities and introduce new hazards. To illustrate, carbon trading schemes that apply market logic to the global atmosphere by treating it as a tradeable commodity are cast as eco-imperialist concoctions that reinforce the global economic order, worsen worldwide gaps of inequality, and drive the very climate crisis they purport to alleviate. As such, ecofeminists believe it is both unreasonable and impractical to have faith in efforts by global elites to improve ecological sustainability and social justice.

In a similar vein, TOP theorists assert that the capitalist system is predicated on constantly expanding production and consumption, which generates ever-increasing rates of

pollution, waste, and demands on natural resources. Profit-seeking capitalists try to grow their bottom line by replacing human labor with machines, with obvious implications for unemployment (see Lesson 4). Labor movements and politicians support economic growth, enticed by the promise of new jobs and increased tax revenues, respectively. Those in positions of social, political, and economic power push for policies that encourage economic growth that exacerbate labor displacement and environmental disruptions. The cyclical nature of economic growth leading to social problems that are then “addressed” by expanding production and consumption that creates even more social problems illustrates the “treadmill” connotation.

Metabolic rift perspectives note the disruption of natural metabolic processes resulting from expansionary tendencies inherent to the system of capital. With regards to climate change, the clearing of forests and burning of fossil fuels disrupt the carbon cycle. In line with TOP, metabolic rift theorists view the drive for endless accumulation as a stable feature of the global system of capital accumulation that is distinctly at odds with sustainability. World-systems theory and ecologically unequal exchange theory share these misgivings by emphasizing the global flows of materials unfairly disadvantage non-core nations and the people in them. For these camps, the only viable solution to environmental problems including climate change is a fundamental transition away from the political-economic system currently in place. For them, abandoning a system that prioritizes profits over people and environmental stewardship is an absolute requirement for advancing sustainability.

In contrast, ecological modernization theories posit that it is possible to work within the current system to instill sound environmental policies and related shifts in production to address climate change. State environmentalism, corporate “greening,” and cultural values that promote environmentally friendly lifestyles are seen as promising avenues to bring about meaningful

change. Critics of such proposals remain unconvinced that state, organizational, and individual-level solutions are viable remedies to what they believe is a systemic problem (a classic “square peg, round hole” scenario). Nonetheless, ecological modernization beliefs most closely characterize current initiatives by international organizations, nations, and institutions to address climate change, but there are many tactical hurdles to implementation, as illustrated below.

In 2015, 196 nations banded together under the Paris Agreement to limit global temperature rise to below 2 degrees Celsius above pre-Industrial limits and to strengthen nations’ capacity to manage the effects of climate change. In a collective effort to instill a pathway towards sustainability (see Lesson 20), countries participating in the Agreement set nationally determined contributions that outline plans for reducing emissions. Despite its fundamental importance, President Trump announced his intentions to withdraw from the Paris Climate Agreement (although he cannot formally do so until 2020) shortly after taking office. In response, major corporations voiced their dissatisfaction while several state and local governments reiterated their allegiance to complying with emission reductions outlined in the accords. However, scientists and climate justice advocates note that strict adherence to the Paris Agreement by all participants will still fall short of the transformative policies, decisions, and practices necessary to chart a course for staying below the 2 degrees Celsius threshold. Thus, mitigating, slowing, halting, and even reversing the industrial practices causing climate change warrant decisive and momentous action if we are to meet stated goals. However, doing so is fraught with powerful political pushback.

There are many ways in which people in positions of power and privilege seek to undermine belief in climate change (see Lesson 6). The Koch brothers, fossil fuel industry billionaires, have spent over \$127 million dollars financing more than 90 groups that attack

climate change science and upwards of \$38 million on lobbying efforts to kill climate legislation. Funding conservative think-tanks, advocacy groups, and political operatives, such as the Heritage Foundation and Cato Institute, are significant avenues for advancing climate denial (see Lesson 5). Prior to the 2016 election, the Heritage Foundation assembled a database of 3,000 names of trusted conservatives and supplied this list to Trump as he began appointing staff for various governmental vacancies; individuals from the database landed jobs in just about every government agency. When Trump was elected, Heritage assembled a transition team to vet ambassadors, diplomats, and cabinet secretaries to make sure they are “change agents”—a key aspect of which is climate change denial.

Conservatives have gone so far as to try and criminalize climate science, as was the case when Virginia’s Attorney General Cuccinelli targeted Michael Mann, a respected scientist whose research confirms the rapid warming of the earth. Cuccinelli alleged Mann was guilty of criminal fraud for using taxpayer’s money to conduct his research; Mann was ultimately cleared of any wrongdoing. Media mogul Rupert Murdoch is another key player in the climate-misinformation campaign. Fox News routinely casts climate change as non-existent, based on hype, hysteria, and uncertainty. Trump fuels the misinformation machine with his cries of “fake news” and related political discourse campaigns to discredit what he deems as “liberal” media outlets, such as the *Washington Post* and *New York Times* that routinely report on the scientific consensus in forecasting myriad humanitarian crises presented by climate change. As covered in Lesson 5, global media conglomerates control information in self-interested ways that limit the democratization of knowledge about climate change.

At the other end of the political spectrum we see an emerging class of politicians who demand action on climate change. The “Green New Deal” spearheaded by Representative

Alexandria Ocasio-Cortez is an exemplary effort to mitigate climate change, address income inequality, and transition to a more sustainable energy regime. Despite some initial setbacks, the ambitious proposal has received widespread attention and seems to be gaining support across citizen groups. Attacked by conservatives as naïve and sophomoric, the stimulus program has thus far failed to garner the degree of favor needed from Democratic party heavyweights and career politicians to enact such ambitious legislative endeavors.

Other national, regional, and local responses to curtail carbon dioxide emissions are emerging to grapple with seemingly intractable rates at which greenhouse gases are emitted. The European Union adopted a cap-and-trade system that sets ceiling limits on emissions while permitting companies to buy and sell carbon permits; however, because carbon prices in Europe remain low the initiative has had negligible effects on overall emissions. China has been experimenting with similar cap-and-trade systems with plans to roll out a nationwide initiative in 2020 that, if successful, will be the largest program for carbon pricing in the world. In Britain, emissions are falling steeply due, in part, to the introduction of a carbon tax in 2013 which prompted the rapid switch of electric utilities away from coal-based power. Canada is in the process of instituting bold carbon taxing schemes to meet Prime Minister Trudeau's stated goal of reducing emissions to 30% below 2005 levels by 2030. However, Conservatives have vowed to appeal the tax should they gain control of Canadian governance in the 2019 election.

Within the United States, the congressional gridlock on climate policy has prompted some action at the state level. For example, the Regional Greenhouse Gas Initiative is comprised of nine states in the Northeast (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont; at the time of this writing, Virginia and New Jersey are entertaining prospects for joining the coalition) seeking to reduce power sector

emissions. The cooperative effort issues CO₂ allowances, with additional pollution permits auctioned to power plants. Despite uncertainty regarding its effect on emissions, participating states have used money from permit purchases to invest in clean energy. California enacted a more extensive cap-and-trade program that reaches beyond power plants to include manufacturers and refineries, among other polluters. Major emissions cuts have come from other state policies, such as efficiency standards for buildings and targets for transitioning to renewable energy.

Elsewhere in the United States aggressive steps are being taken to reclaim profits from the energy sector to remunerate for the destruction and loss of natural ecosystems that buffer communities from myriad climate-related threats. In Louisiana, local coalitions have catalyzed efforts to hold the oil and gas industry accountable for damages to wetlands caused by practices to extract and transport energy. Reckless demolition of fragile marshlands from dredging canals, drilling wells, and installing pipelines that connect wells to processing facilities is accelerating subsidence, or the loss of land. Quite simply, the southeastern coast of Louisiana is disappearing due to violent destruction. Each hour, the state loses about a football field's worth of land.

Wetlands loss has catastrophic implications as they are the state's first and strongest defense against hurricanes. In response, local activists in concert with the regional levee board leveled "the most ambitious environmental lawsuit ever" against 97 oil and gas companies in 2017, alleging gross industry negligence and failure to implement mandated guidelines for restoration. The energy companies targeted by the lawsuit (including ExxonMobil, BP, and Koch industries, among others) galvanized a powerful alliance of lobbying and political persuasion to derail the litigation. Ultimately, the energy industry emerged victorious—the board's lawsuit was dismissed in district court, refused by the court of appeals, and that denial was upheld by the

Supreme Court. The stronghold by energy barons over legal procedure and political process was proven, once again. At the time of this writing, seven Southern parishes in Louisiana have filed suit against a dozen corporate defendants seeking restitution for damages to wetlands from the companies that profited mightily from their destruction. The success of their effort remains to be seen, but history suggests, at minimum, it will be a hard-fought battle.

Concluding Remarks

The sociological approaches to environmental impact treated above are rooted in classical theorizations of social development and change as articulated by Durkheim, Weber, and Marx (or the “Dead White Men”). Tracing these perspectives to their theoretical origins has major implications for how you think social change occurs and what actions are best suited to further those goals, including the adoption and institutionalization of pro-environmental norms to promote principles of sustainability. For instance, do you think government interventions, regulations, and policies are ideal avenues for creating a “kinder, gentler, greener” capitalism? Or, do you believe change starts from below with shifts in individuals’ attitudes that lead to the institutionalization of environmental concern? Or, do you remain convinced that a new political-economic regime is necessary to chart a path to sustainability?

Durkheimian models (closely tied to human ecology and EMT) offer that the process of development presents possibilities for advancing sustainability via the greening of corporate practices, state interventions, and individual values, in tandem with increases in efficiency, technological advances, and pro-environmental policies. Environmental reform and state environmentalism are theorized to be a “luxury” of the more economically and technically advanced countries of the world. EMT suggests that political institutions and economic actors globally will eventually see the value of engaging in environmentally friendly practices and will

push for stronger environmental laws and enforcement. The central thesis of EMT is that environmental problems can be solved through modernizing existing social, political, and economic institutions—that is, going further into the process of development. Critics of this approach question the ecological implications of promoting a Western model of development, noting that the global attainment of wealth at levels currently witnessed in the US would have catastrophic environmental consequences. Others cast suspicion on the efficacy of state regulations and policies, arguing dubious enforcement and monitoring of pro-environmental interventions make them merely symbolic.

For Weber, the (macro, structural) process of modernization is a historical trend of increased rationality in all spheres of life. As societies modernize, rational actors organize society and its institutions to maximize predictability, calculability, and efficiency; for Weber, this is an inescapable condition of modernity. Applied to the global scale, kindred theories (e.g., world-polity) identify cultural shifts toward rationality as the primary mode by which global environmentalism is achieved. As individuals and institutions embrace rationality as an organizing concept, and insofar as environmentalism is deemed rational, the cultural diffusion of pro-environmental norms is predicted to occur across nations engaged in the world society. Thus, environmentally-friendly norms developed in advanced nations of the global North may be adopted by hierarchically weaker nations in the global South.

Similar to Durkheimian perspectives treated above, critics of the Weberian model cast doubt on the efficacy of environmental ministries and participation in environmental treaties translating to actual improvements to the environment. A Weberian approach to social change prioritizes cultural embrace of environmental concern as the primary avenue by which sound environmental practices become institutionalized. However, the degree to which evidence of an

environmental regime serves as an effective check against rising emissions remains to be seen. Weber is the ultimate pessimist in predicting the process of rationalization will ultimately lead to the “irrationality of rationality” whereby we become obsessed with the means (i.e., process) and lose sight of the ends (i.e., product) we seek to achieve. To illustrate, obsessing over the adoption of environmental treaties and protocols is meaningless if strict enforcement and careful monitoring of progress to achieve stated goals remain elusive, which is a predicament for current initiatives to mitigate climate change discussed earlier. Obsession with the process of institutionalizing action to curtail climate change takes precedence while we lose sight of tracking actual progress. For Weber, as life becomes more calculating it ultimately leaves us trapped in an iron cage of rationality and will remain this way “until the last ton of fossil fuel is burnt.”

Marxist approaches and their recent iterations (world-systems theory, metabolic rift, TOP) see no potential for aligning the system of capital with sustainability. The inherent growth maxims that seek to spread capitalism to every nook and cranny around the world, commoditizing labor and natural resources to further the goal of endless capital accumulation are viewed as diametrically at odds with ecological sustainability. Accordingly, for Marxist adherents the only way to achieve sustainability is by transitioning away from the current political-economic system. For Marx, capitalism precedes utopia; gains in production brought about from the capitalist era arm us with the material advances necessary to transition to a just system that prioritizes the egalitarian distribution of resources. The 99% and Occupy movements share many ideological principles with Marxist beliefs that the history of civilization is a history of class struggle. Indeed, Marx theorizes the unsustainability of the capitalist system “sows the seeds of its own destruction” via the overexploitation of land that disrupts natural metabolic

processes and the overexploitation of labor that leads to the emergence of a class consciousness. This shared consciousness is theorized to unite the proletariat in a revolution from below to overthrow the capitalist system, supplanting it with a new economic regime.

Critiques of this model argue Marx's predictions of a revolution have proved wrong. Others disagree with the basic premise that capitalism cannot be reoriented to align with principles of sustainability. Still others doubt the viability of reorganizing society in such profound ways without an existing blue print for doing so, though there have been some efforts to provide concrete suggestions for possible alternatives to capitalism. There is also speculation about the ability of organized action to be strong enough to overthrow such a powerful, firmly entrenched global system of capital accumulation. Finally, as some point out most people find it easier to imagine the end of the planet than the end of capitalism.

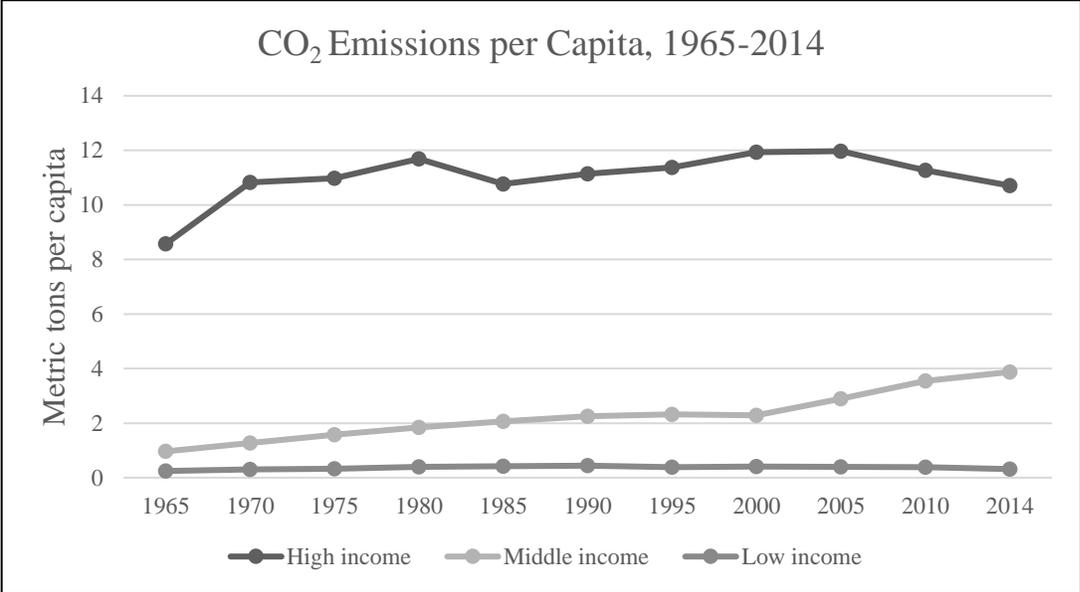
Clearly, the orientation you adopt has deep implications for how you think society is best positioned to alleviate climate change. Taken in tandem with the examples of recent responses to address—and efforts to deny—climate change treated above provides an opportunity to vet your philosophical leanings against existing strategies to implement meaningful change. There is also a certain amount of unpredictability associated with any vision of the future, which makes the choice even murkier. Ultimately, though, it is your generation that will confront climate change or be forced to live with the catastrophic consequences. Theories from Durkheim, Weber, and Marx and their modern iterations provide several scenarios for applying sociological concepts and models of social change to imagine possible ways forward. Armed with this sociological backdrop, it is now up to you to decide: What path will you choose? This is a major decision rife with deep implications for how to invest your efforts, so take your time in making the decision, but do not wait too long because it is your future that is at stake.

Table 1. Forest land (in squares miles) by income group, 1990-2015

	1990	1995	2000	2005	2010	2015	% Chg.¹	<u>Avg.</u> <u>Annual</u> <u>% Chg.</u>
High income	10,316,559	10,348,342	10,380,127	10,382,188	10,385,224	10,427,004	1.07	0.07
Middle income	26,326,758	26,058,347	25,789,940	25,679,163	25,629,429	25,720,292	-2.30	-0.15
Low income	171,440,460	4,123,115	4,004,630	3,893,490	3,778,510	3,752,960	-97.81	-6.52

¹ Negative numbers indicate deforestation; positive numbers indicate reforestation.

Figure 1. CO₂ Emissions (metric tons) per Capita across income groups, 1965-2014



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