2023

Proceedings of the Faculty Seminar on Climate Change, 2023

Lisa Rose-Wiles

Jacob Weger

Proceedings of the

Faculty Seminar on Climate Change, 2023

A Multidisciplinary Seminar in Three Parts

October 26, November 3, and November 9, 2023.

Adobe Stock Image "Green energy planet in hands"
By Budairomi; educational license.

Sponsored by the Mission Mentors Program,
Coordinated by the Mission Related Faculty Development Committee
Supported by the Office of Mission & Ministry.

Seminar organizers and editors: Lisa Rose-Wiles, Ph.D. (University Libraries) and Jacob Weger, Ph.D. (Environmental Studies & Department of Sociology, Anthropology & Criminal Justice).

SETON HALL UNIVERSITY
1 8 5 6

Table of Contents

INTRODUCTION

Seton Hall University Faculty Seminar on Climate Change
October 26, 2023

Jacob Weger, Ph.D.
Lecturer, Environmental Studies & Department of Sociology, Anthropology & Criminal Justice.

Everywhere you look these days, the effects of climate change are upon us. It is no longer an abstract threat, projected to affect the coming generations at some uncertain point in the future. Instead, we feel it in strange, unseasonably warm temperatures, and we see it in the constant barrage of headlines announcing extreme weather events around the world. The evidence piles up in the form of heat waves, drought, wildfires, heavy rain and floods. Is this the "new normal" or the "new abnormal"?

Climate change is certainly becoming impossible to ignore, so that now even the fiercest skeptics are biting their tongues. And year after year it's more of the same. These impacts are only predicted to increase in the foreseeable future, meaning that our students and children will bear the brunt of processes set in motion long before they were born.

Scientists have been sounding the alarm bells of global warming since at least 1987 when they presented the state of the evidence at a US congressional hearing. That is when the "hockey stick" graph became famous, highlighting the sudden spike in global temperatures since around the time of the industrial revolution, above an otherwise relatively stable baseline that lasted thousands of years. That's when humans began emitting greenhouse gases into the atmosphere at large scale to drive industrial economic development, a process which only expanded ever since. This later became a key indicator of the newest geological epoch scientists are now calling the "Anthropocene" for the irreversible impact of humans on the global environment.

Of course, we've *known* about the physical process underlying climate change—the greenhouse effect, a process analogous to that which allows for the trapping of UV radiation in literal greenhouses—for much longer. This process was first demonstrated with respect to the atmosphere in 1859 by Irish physicist John Tyndall.

But anthropogenic climate change is far more than a typical physical-environmental phenomenon, as both its causes and consequences are intimately tied up with social systems and the human experience—our politics and economics; human health, security, and wellbeing; and questions of ethics, justice, and agency. It seems to defy our very sense of time, space, and scale, and challenges our ability to reckon with our species' outsized impact on the natural world, at planetary scale.

What we now know from the most recent assessment reports of the Intergovernmental Panel on Climate Change (or IPCC), is that there is a glimmer of hope: the worst-case future scenarios that until recently seemed likely, now look much less so (IPCC 2023). We've shown that appropriate policy measures and green technologies can go a long way towards getting our GHG emissions under control. And yet, the currently likeliest future scenarios are still far and away beyond levels of global warming once thought "disastrous." In other words, we have a long way to go, and a lot of adapting and supporting the most vulnerable to do, regardless. We are far from on track to meet the goals set out in the Paris Climate Accords in 2015, and yet it's clear the future of the climate is still largely up to us to decide.

The Pope himself, after throwing his support behind efforts to reign in climate change and pursue an "integral human ecology" in 2015 with the publication of the encyclical *Laudato Si* (Pope Francis 2015), recently published his follow-up, *Laudate Deum*, coming out as a full-fledged climate alarmist, in the words of David Wallace-Wells from the NYTimes (Wallace-Wells 2023).

For this Faculty Seminar on Climate Change, Lisa and wanted to organize something that could engage perspectives from multiple disciplines—from the sciences, social sciences, humanities, and theology—and foster a dialogue that actively engages the Catholic Intellectual Tradition while focusing on integrative approaches and solutions.

Today, we'll hear from Father Joseph Laracy, on Catholicism and care for creation, followed by Marian Glenn from Biology, on nature-based approaches to address global warming. Next Friday, Nov. 3 at the same time, we'll hear presentations from Jared Best from Social Work, speaking on the relevance of social work to address the social justice implications of climate change; Thomas Rzeznik from History, speaking on *Laudato Si* in the context of Catholic social teaching; and Heinrik Hellwig from Philosophy, looking at the Inflation Reduction Act through the lens of a controversial philosophical idea. Then the following Thursday, Nov. 9, we'll hear presentations from Michael Taylor, from Political Science, on the WHO's "One Health" initiative that seeks to integrate public health with animal and environmental welfare; and finally, Judith Stark from Philosophy on the phenomenon of "climate anxiety," and how we can mobilize it into constructive action. Lisa and I will then provide some summary comments. Following each set of speakers, we'll open it up for discussion, and we hope to have a dynamic and fruitful exchange.

Bibliography

Intergovernmental Panel on Climate Change (IPCC). 2023. "Summary for Policymakers." In *Climate Change 2023: Synthesis Report.* Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.001.

Pope Francis. 2015. *Laudato Si': On Care for Our Common Home [Encyclical]*. Available at: http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html.

Wallace-Wells, David. 2023. "The Pope's Journey to Climate Outrage." The New York Times, October 11, 2023. https://www.nytimes.com/2023/10/11/opinion/the-popes-journey-to-climate-outrage.html.

CATHOLICISM AND CARE FOR CREATION

Seton Hall University Faculty Seminar on Climate Change
October 26, 2023

Rev. Joseph R. Laracy, S.T.D.
Assistant Professor of Systematic Theology

Thank you for the opportunity to speak today on the topic of Catholicism and care of creation. I thought that I should first speak briefly about what we mean by "creation" in the Catholic Intellectual Tradition. When you hear that word, perhaps you think of the beginning of the Bible, the Book of Genesis. In the very first verse we read, "God created the heavens and the earth." Creation is a mystery. It has inspired great works of art and literature, as well as other cultural expressions. Creation has been for Jews, Christians, and Muslims a profound area of theological reflection. In Genesis 1, beginning in verse 27, we read about the creation of mankind. Men and women are made in the Divine image and bear a solemn responsibility that comes from God: the responsibility of good stewardship.

Man has the duty to be a good steward—to care for the Earth, to till the soil, to gather its yield, to sustain himself and his family, and to propagate the human race. Creation is an awesome gift, but it is a gift that brings with it a tremendous responsibility. Genesis 1 and 2 explicate the beautiful interconnectedness of creation which I am going to talk about throughout this presentation. Man is the pinnacle of God's work in creation, yet there is a profound interconnectedness with all living things, and indeed all of nature.

We are aware that there are other perspectives on the natural world. Thinkers outside of the Catholic Intellectual Tradition will sometimes use the noun, "creation," or the verb, "create," in a very different way. A very distinguished theoretical physicist of the late twentieth and early twenty-first century, Stephen Hawking (1942–2018), promoted what we might call a "materialist" perspective.[1] Hawking was not a Christian; he was widely known as an atheist. In the popular book, *The Grand Design*, Hawking and his co-author, Leonard Mlodinow, write, "Because there is a law such as gravity, the universe can and will create itself from nothing[2]…Spontaneous creation is the reason there is something rather than nothing, why the universe exists, why we exist. It is not necessary to invoke God to light the blue touch paper and set the universe going" (Mlodinow and Hawking 2012, 180).

Hawking and Mlodinow use the word "create" in a profoundly different way than a philosopher or theologian. For Catholic Christians, creation refers to God's work bringing beings into existence from nothing. We say that God creates "*ex nihilo et cum tempore*" (from nothing and with time). Hawking and Mlodinow's "no universe" state is not nothing. It is one particular

[1] For an overview of materialism, see Gutberlet (1911).
[2] This concept was initially proposed by Vilenkin (1982). As Stephen Barr points out, this idea is "extremely speculative, has not yet been formulated in a mathematically rigorous way, and is unable at this point to make any testable predictions." Barr further states, "For physicists (as opposed to theologians and metaphysicians) the concept of the universe does not refer to 'all there is' or the 'totality of things.' It refers to a single, self-contained physical structure, comprising a 'spacetime manifold' and particles and other things moving around in that spacetime" (Barr 2010). Jaki (1993) takes up the question, Is there a Universe?

quantum state among many. Hawking and Mlodinow are referring to a speculative scenario that involves the spontaneous formation of matter from a vacuum state in the context of quantum mechanics. They are talking about a fluctuation that produces the space and whatever it contains (and obeys the laws of quantum field theory). A philosophical and theological "nothing" and a physics vacuum state[3] (what some physicists call "nothing") are very different things. In fact, from the perspective of the discipline of physics, one cannot "create" a universe from "nothing" because physics cannot deal with the idea of non-being. There must be physical laws to say anything sensible in the world of physics.[4]

A proper ontology and robust notion of causality are necessary to reflect on the mystery of creation. Catholics acknowledge that God is the source of the *actus essendi* (the act of being). God creates from nothing (*ex nihilo*), and God sustains His creation in existence (*conservatio*). As Mariusz Tabaczek concisely puts it, all created beings "naturally and necessarily depend on God for their existence and essence" (Tabaczek 2022, 60). Some of the most common questions in the history of philosophy are: Where does all this come from? Why are we here? Why does the cosmos exist? Because from nothingness, nothing comes—*ex nihilo nihil fit*. These are perennial human questions—existential questions about origins. The theology of creation is sometimes referred to as protology, because it addresses the theology of origins, of beginnings, of first things, from a cosmological perspective. This is the context of the Catholic doctrine of *creatio ex nihilo et cum tempore*—creation from nothing and with time. But also, there is an anthropological dimension, i.e., the creation of man.

The theology of creation is also articulated in Catholic Social Teaching. We see very strong statements throughout the Catholic tradition, i.e., from popes, from theologians, from the people of God, about the ethical imperative of care for this creation. Creation is a gift from God. It is the work of the Divine artist. We are made in His image and invited to beatitude. Blessed with His grace, we are called to do everything we can to be good stewards. And this leads us to what I think Pope Francis is calling us to, in line with his predecessors, especially Benedict XVI and John Paul II, to move in the direction of an *integral human ecology*. The popes are inviting us to acknowledge the interconnectedness of all of creation.

What is the history of Catholic reflection on creation? The doctrine of creation is a very ancient part of the Catholic faith. We see as far back as the early Patristic period that Catholic Christians are professing faith that:

1) God is the creator of the world;
2) God created from nothing, not from preexisting matter, as you see in many of the pre-Christian creation stories or cosmogonic myths;

[3] It is important to clarify what Stephen Hawking means when he refers to vacuum fluctuations. The word "vacuum" has more than one meaning even in physics. In many contexts it means just empty space. However, in quantum field theory the vacuum state means the ground state of a system, i.e., the state with lowest energy. In the context in which Hawking is discussing vacuum fluctuations, he is not just talking about a fluctuation that takes place within some pre-existing empty space.

[4] Interesting, Hawking later recanted some of these simplistic views, although apparently never his atheism. His former student Thomas Hertog, in a very recent book relates their efforts to find a theory of the nature of time that renders what is in *The Grand Design* obsolete, and tends more toward the need for a Creator, although they do not say this (Hertog 2023).

3) God creates directly without secondary causes, i.e., God does not need tools, God does not need instrumentality; and
4) God created not only material and spiritual beings but also time—temporality, i.e., time itself is also part of the creation (Aquinas 1997, 22).

God Himself is self-subsistent being. God is eternal, immutable, omniscient, and omnipotent. He creates out of love, not out of necessity. And we are the fruit of that love. One early Christian writer who engages this theme is Hippolytus of Rome, in his work *The Refutation of All Heresies*. He is professing faith in God the Creator:

> The first and only (one God), both Creator and Lord of all, had nothing coeval with Himself; not infinite chaos, nor measureless water, nor solid earth, nor dense air, not warm fire, nor refined spirit, nor the azure canopy of the stupendous firmament. But He was One, alone in Himself. By an exercise of His will He created things that are, which antecedently had no existence, except that He willed to make them (Hippolytus, bk. X, chap. 28).

Hippolytus' theology is clearly distinct from the pre-Christian, pagan perspective of pantheism where nature is deified, e.g., ancient Egyptian religion.[5] Hippolytus distinguishes between God the Creator and His work, i.e., creation. Turning again to Scripture, I call your attention to examples from both the Old Testament with the Book of Wisdom 13:1-9 and the New Testament with St. Paul's Letter to the Romans 1:19-20. Both texts make an important point: God the Creator can be known from creation, and this is accessible to man through reason alone. This truth is *also* taught by the Scriptures, both Old and New Testaments. However, God the Creator's existence can be known by reason alone. It is quite remarkable! Ultimately this Biblical teaching is formalized as a dogmatic statement by the First Vatican Council. The Church formulated this dogma in response to the denial of this reality: "The same Holy Mother Church holds and teaches that God, the beginning and end of all things, can be known with certainty from the things which were created through the natural light of reason" (Dei Filius 1870, chap. 2).

The natural knowledge of God, i.e., natural theology, is intimately connected with the theology of creation. Many of us are thinking about the coming feasts of Christmas and the Epiphany of the Lord. I often go back to a beautiful homily from when I was a seminarian that Pope Benedict XVI gave in 2011 for the Epiphany. He made what I thought was a very important observation about the Magi. Recall that the Magi were not Jews. They were not members of God's people, i.e., descendants of Abraham; they were gentiles. Yet, Benedict points out that the Magi were "were people certain that something we might describe as the 'signature' of God exists in creation, a signature that man can and must endeavor to discover and decipher" (Benedict XVI 2011a). In their study of nature, in their study of creation, the Magi were led to God. You and I are offered that invitation as well by the Lord.

Continuing our journey through Scripture, we note throughout the Old and New Testaments many references to the doctrine of creation discussing both the origins of the universe and the origin of humanity. In our reflection on creation: philosophical, artistic, theological, and scientific, we discover a glimpse of the Creator. Just as when we look at a work of visual art, or

[5] For more on the pantheism of ancient civilizations and its detrimental impact on the emergence of natural science, see Jaki (1990).

we listen to a piece of music, we have some insight into the artist or the composer. So too, when we look at the work of creation, we learn something about God.

The care, or good stewardship of creation, is a major concern today. My doctoral advisor, Father Paul Haffner, wrote a book on this topic, *Towards a Theology of The Environment* (Haffner 2008). I wish that there were more theology books like his. However, this is very much a new field, an area of theological reflection apposite to contemporary concerns. Perhaps this faculty seminar, and the conversations that flow from it, will produce more scholarship. In any case, this concern about care for creation is clearly a part of the Tradition, especially Catholic Social Teaching. In fact, within Catholic Social Teaching, care for creation is one of the essential dimensions. Others include affirming the dignity of workers, solidarity with the poor, respecting the dignity of all human life, supporting families, and the principle of subsidiarity (Anderson, Laracy, and Marlowe 2020). The Holy Father, Pope Francis, is asking us to focus on all these dimensions.

I used an excerpt from a poetic prayer composed by St. Francis of Assisi, "*Laudato Si'*," for the opening prayer of our faculty seminar. Originally composed in St. Francis' thirteenth century Umbrian dialect, this prayer is a beautiful and very profound reflection on creation and on God the Creator. It calls to mind our interconnectedness within creation and the importance of an attitude of gratitude for God's gift. When we examine Pope Francis' 2015 encyclical, which takes its title from St. Francis' prayer, we see that there are many aspects to it. Pope Francis engages in a critique of consumerism and irresponsible development, as well as a very strong lamentation about the degradation of the environment. He issues a call for swift and unified global action to care for God's creation (Francis 2015a).

One of the reasons that we have gathered for this seminar is the concern about the growing concentration of carbon dioxide and other greenhouse gases in the atmosphere as a result of industrial activity. One of the best articles that I have read on Earth's carbon cycle from a scientific perspective was written by Daniel Rothman of MIT. He wrote a wonderful piece for the *Bulletin of the American Mathematical Society* which I highly recommend (Rothman 2015).

Electric power generation is a significant contributor to emissions. Often different technologies are used for "base load" power generation compared to "peak load." The "base load" is the minimum level of power required over the course of a day, while the "peak load" refers to anticipated spikes in demand over a shorter period. It is very common to use nuclear power and coal to provide the base load. From an engineering perspective, they are both efficient and effective ways to produce electricity. Other technologies may be used to fill the peaks, e.g., natural gas, to give the grid a boost to keep our air conditioning units running during the hottest days of summer.

The US Department of Energy's Information Administration reports that 63% of our electricity produced in 2019 was generated from fossil fuels, i.e., coal, natural gas, petroleum, and other gases (US Energy Information Administration 2020). This is very concerning because of the particulates that are emitted along with sulfur dioxide, nitrogen oxides, mercury, arsenic, and radioactive fly ash. Fly ash, which contains uranium, thorium, potassium, and radium, is a major concern for human health and the environment. All these pollutants are very detrimental to the

body and produce negative effects on the cardiovascular, respiratory, and nervous systems. These exposures lead to greater risks for lung cancer, stroke, heart disease, chronic respiratory diseases, and increased susceptibility to respiratory infection (US Environmental Protection Agency 2020).

In light of the studies that have been done looking at the immediate occupational risks, delayed occupational risks, the immediate public risks delayed public risks, and the risks of severe accidents, there is a very compelling case to move away from coal-based sources of electricity and to move in the direction of nuclear power (Haddad and Dones 1991). Attempts to move in this direction have faced tremendous difficulties, not from an engineering or scientific perspective, but from the point of view of politics—the "NIMBY" (Not In My Backyard) mentality. This fear has really been an impediment to both the development of new nuclear reactors as well as the long-term storage of spent nuclear fuel, i.e., the radioactive uranium, plutonium, and other fission products leftover from the reactions. The best way to confront this challenge is through science education, i.e., teaching people about the true risks to human health and the environment which come from our reliance on fossil fuels as the primary means of generating electricity (Laracy 2020).

Another issue related to power generation is the great potential of space based solar power. I was privileged to study this topic as a graduate student at MIT. My colleagues and I presented our research at the American Institute of Aeronautics and Astronautics Space Conference (Laracy et al. 2007). We asked, Can we develop a rational technical strategy to refocus space based solar power research? The original concept goes back to the 1960s. Peter Glaser had the brilliant idea to carry out early feasibility studies on the technology and operational systems needed to support capturing solar power in space and transmitting it back to Earth. This would allow us to capture a larger proportion of the energy radiated by the sun compared to solar panels on earth. The light captured by space based solar power would not be attenuated by our atmospheric gases or by pollution. These satellites would be placed in geosynchronous orbit and continuously exposed to solar radiation. They would transmit energy to earth via microwaves (which experience much less attenuation due to the atmosphere). The microwave energy would be received by rectennas, and then converted into electricity (Glaser 1968; 1977). One of the major impediments to the development and deployment of this technology at that time was the high cost of space launch, i.e., the cost per kilogram to move material into Earth's orbit. We have made great strides in this area, both through the efforts of NASA and private industry. I hope that space based solar power will be another part of a long-range solution to produce electricity in a way most beneficial for human life, and indeed our entire planet.

I would like to return now to Pope Francis and *Laudato Si'*, and specifically the notion of an integral human ecology. What do we mean by that in Catholic theology? Pope Francis contributed a reflection to the book, *Not Just Good, But Beautiful*, in which he offers an explanation. Francis writes,

> The crisis in the family has produced a crisis of human ecology, for social environments, like natural environments, need protection. And although the human race has come to understand the need to address conditions that menace our natural environments, we have been slower to recognize that our fragile social environments are under threat as well,

> slower in our culture, and also in our Catholic Church. It is therefore essential that we foster a new human ecology and advance it (Francis 2015b).

I have learned a lot about this topic from Eduardo Echeverria. Professor Echeverria was a visiting scholar a few years ago at Seton Hall in our Seminary School of Theology. He published a fantastic article examining what we might call the theological mind of *Laudato Si'* (Echeverria 2019). How should a Catholic interpret this encyclical? *Laudato Si'* is certainly a call to action for natural conservation, as I mentioned, but it is more than that. Pope Francis is calling for an integral ecology, continuing to develop a message articulated by John Paul II and Benedict.

A key event in the development of this integral ecology was the Salzburg Declaration in 2015. This was a historic ecumenical summit organized by a Protestant organization, the International Christian Network. The attendees gathered to discuss cultural threats both to the human person and to nature. What came out of this conference was a document entitled "Current Threats to Human Creatureliness and Their Overcoming: Life According to the Creator's Will." The document explains how we need to expand our ecology of environment into an ecology of man. This means having a comprehensive vision of the human person in relation to the Triune God, other people, and the whole of creation. This includes promoting family life, educational opportunities, responsible urban planning, and more (International Christian Network 2015).

Francis writes,

> If everything is related, then the health of a society's institutions has consequences for the environment and the quality of human life…Together with the patrimony of nature, there is also a historic, artistic and cultural patrimony that is likewise under threat…Ecology, then, also involves protecting the cultural treasures of humanity in the broadest sense (Francis 2015a, para. 143).

In a later address to the Pontifical Academy for Life, Francis states, "In our time, certain cultural orientations no longer recognize the imprint of divine wisdom in created things, not even in the person. Human nature is thus reduced to mere matter, pliable to any design" (Francis 2016). This very "Baconian" view of science and technology can be a threat both to the environment and to human life.

Integral ecology in Francis' theology should lead towards integral human development and ultimately authentic human flourishing. We see this as well in the thought of John Paul II. His 1991 encyclical entitled *Centesimus Annus* states,

> In addition to the irrational destruction of the natural environment, we must also mention the more serious destruction of the human environment, something which is by no means receiving the attention it deserves. Although people are rightly worried—though much less than they should be—about preserving the natural habitats of the various animal species threatened with extinction, because they realize that each of these species makes it particular contribution to the balance of nature in general, too little effort is made to safeguard the moral conditions for an authentic "human ecology." Not only has God given the earth to man, who must use it with respect for the original good purpose for

> which it was given to him, but man too is God's gift to man. He must therefore respect the natural and moral structure with which he has been endowed (John Paul II 1991, para. 38).

Finally, I shall conclude with a quote from Benedict XVI to the Bundestag in Germany. Benedict states,

> The importance of ecology is no longer disputed. We must listen to the language of nature and we must answer accordingly. Yet I would like to underline a point that seems to me to be neglected, today as in the past: there is also an ecology of man. Man too has a nature that he must respect and that he cannot manipulate at will. Man is not merely self-creating freedom. Man does not create himself. He is intellect and will, but he is also nature, and his will is rightly ordered if he respects his nature, listens to it and accepts himself for who he is, as one who did not create himself. In this way, and in no other, is true human freedom fulfilled (Benedict XVI 2011b).

Pope Francis and his predecessors' call for an integral ecology is deeply rooted in Catholic Social Teaching. Catholic Social Teaching has been widely deployed. We see it reflected in various aspects of American society and law as well as the UN Declaration on Human Rights. Care of creation, i.e., our common home, is an essential dimension of this theological tradition. Thank you very much for the opportunity to share some of my thoughts about the Catholic theology of creation.

Acknowledgements

I would like to express my gratitude to the Rev. Dr. Paul Haffner (Pontifical Gregorian University), Dr. Eduardo Echeverria (Sacred Heart Major Seminary), Dr. Lisa Rose-Wiles (Seton Hall University), Dr. Robert J. Scherrer (Vanderbilt University), Dr. Jonathan I. Lunine (Cornell University), Dr. Stephen M. Barr (University of Delaware), the Rev. Dr. David Brown (Vatican Observatory), and Dr. Karin Öberg (Harvard University).

Bibliography

Anderson, Justin, Joseph R. Laracy, and Thomas Marlowe. 2020. "A Multi-Disciplinary Analysis of Catholic Social Teaching with Implications for Engineering and Technology." *Journal of Systemics, Cybernetics, and Informatics* 18, no. 6: 41–49.

Aquinas, Thomas. 1997. *Aquinas on Creation*. Translated by Steven Baldner and William E. Carroll. Toronto: Pontifical Institute of Mediaeval Studies.

Barr, Stephen M. 2010. "Much Ado About 'Nothing': Stephen Hawking and the Self-Creating Universe." First Things. September 10, 2010. https://www.firstthings.com/web-exclusives/2010/09/much-ado-about-nothing-stephen-hawking-and-the-self-creating-universe.

Benedict XVI. 2011a. “Solemnity of the Epiphany.” Homily, Vatican City State, January 6. https://www.vatican.va/content/benedict-xvi/en/homilies/2011/documents/hf_ben-xvi_hom_20110106_epifania.html.

———. 2011b. “Address of His Holiness, Benedict XVI, to the Bundestag.” Reichstag Building, Berlin, Germany, September 22. https://www.vatican.va/content/benedict-xvi/en/speeches/2011/september/documents/hf_ben-xvi_spe_20110922_reichstag-berlin.html.

Vatican Council I. Dei Filius. 1870.

Echeverria, Eduardo. 2019. “Integral Ecology of Man: The Theological Mind of Laudato Si’.” *Homiletic and Pastoral Review*, September (September). https://www.hprweb.com/2019/09/integral-ecology-of-man/.

Francis. 2015a. Laudato Si’.

———. 2015b. “Not Just Good, But Beautiful.” In *Not Just Good, but Beautiful: The Complementary Relationship between Man and Woman*, edited by Helen Alvaré and Steven Lopes, 2–5. Walden, MA: Plough Publishing House.

———. 2016. “Address of His Holiness, Pope Francis, to Participants in the Plenary Assembly of the Pontifical Academy for Life.” Vatican City State, March 3.

Glaser, Peter E. 1968. “Power from the Sun: Its Future.” *Science* 162, no. 3856 (November): 857–61. https://doi.org/10.1126/science.162.3856.857.

———. 1977. “The Potential of Satellite Solar Power.” Pr*oceedings of the IEEE* 65, no. 8 (August): 1162–76. https://doi.org/10.1109/PROC.1977.10662.

Gutberlet, Constantin. 1911. “Materialism.” In *The Catholic Encyclopedia.* Vol. 10. New York: Robert Appleton Company. http://www.newadvent.org/cathen/10041b.htm.

Haddad, S., and R. Dones. 1991. “Comparative Health and Environmental Risks for Various Energy Sources.” *IAEA Bulletin*, March (March), 14–19.

Haffner, Paul. 2008. *Towards a Theology of the Environment*. Leominster, UK: Gracewing Publishing.

Hertog, Thomas. 2023. *On the Origin of Time: Stephen Hawking’s Final Theory.* New York: Bantam.

Hippolytus. 1886. “Refutation of All Heresies.” In *Ante-Nicene Fathers*, edited by Alexander Roberts, James Donaldson, and Arthur Cleveland Coxe, translated by John Henry

MacMahon. Vol. 5. Buffalo, NY: Christian Literature Publishing Co. http://www.newadvent.org/fathers/050110.htm.

International Christian Network. 2015. Current Threats to Human Creatureliness and Their Overcoming: Life According to the Creator's Will. Salzburg, Austria. https://thenalc.org/wp-content/uploads/Documents/Teaching%20Statements/Salzburg-Declaration-2015-SEPT.pdf.

Jaki, Stanley L. 1990. *Science and Creation*. Lanham: University Press of America.

———. 1993. Is There a Universe? New York: Wethersfield Institute.

John Paul II. 1991. Centesimus Annus.

Laracy, Joseph R. 2020. "Towards an Ethical and Ecological Approach to Electricity Generation: A Comparative Analysis of Coal and Nuclear Power in the USA." *Open Journal of Ecology* 10, no. 6 (June): 370–79. https://doi.org/10.4236/oje.2020.106023.

Laracy, Joseph R., Damien Bador, Danielle Adams, and Annalisa Weigel. 2007. "Solar Power Satellites: Historical Perspectives with a Look to the Future." In . Long Beach, CA: American Institute of Aeronautics and Astronautics. https://doi.org/10.2514/6.2007-6057

Mlodinow, Leonard, and Stephen Hawking. 2012. *The Grand Design*. New York: Bantam.

Rothman, Daniel. 2015. "Earth's Carbon Cycle: A Mathematical Perspective." *Bulletin of the American Mathematical Society* 52, no. 1: 47–64. https://doi.org/10.1090/S0273-0979-2014-01471-5.

Tabaczek, Mariusz. 2022. "Does God Create Through Evolution? A Thomistic Perspective." *Theology and Science* 20, no. 1 (January): 46–68. https://doi.org/10.1080/14746700.2021.2012917.

US Energy Information Administration. 2020. "What Is U.S. Electricity Generation by Energy Source?" 2020. http://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3.

US Environmental Protection Agency. 2020. "TENORM: Coal Combustion Residuals." 2020. https://www.epa.gov/radiation/tenorm-coal-combustion-residuals.

Vilenkin, Alexander. 1982. "Creation of Universes from Nothing." *Physics Letters B* 117, no. 1 (November): 25–28. https://doi.org/10.1016/0370-2693(82)90866-8.

REGENERATING ECOSYSTEMS TO COOL THE EARTH AND RESTORE A LIVABLE CLIMATE.

Seton Hall University Faculty Seminar on Climate Change
October 26, 2023

Marian Glenn, Ph.D.
Emeritus Professor, Department of Biological Sciences.

Over the course of billions of years, life on Earth created a complex global ecosystem energized by solar energy and sustained by complex recycling of materials, especially carbon and water. Earth's natural ecosystems are self-sustaining, and buffer themselves against swings in weather. Human culture, especially industrialization, deforestation, and extensive agriculture have destroyed more and more of these ecosystems rendering the planet vulnerable to a changing climate. While the greenhouse gases from burning fossil fuels are contributing to Earth's rising temperature, deforestation, urbanization, and the destruction of living soil prevent efficient recycling of carbon and water. Regenerating Earth's damaged ecosystems is essential to sustaining Earth's livable climate. These solutions are relatively low tech, and are being implemented by individuals and governments around the world. They are as essential to solving the climate crisis as ending the use of fossil fuels.

Earth's average temperature is rising, and we are learning new terminology: heat domes, annual hundred-year storms, atmospheric rivers, long distance smoke, fire thunderstorms produced by pyrocumulonimbus clouds. Weird and dangerous weather pops up anywhere in the world. Mainstream news links the rise in Earth's average temperature to the release of greenhouse gases from fossil fuels. Greenhouse gases prevent the sun's heat from being re-radiated back into space, heating the planet, and disrupting Earth's climate system, which now gives us weird and dangerous weather. The solution is to stop burning fossil fuels and switch to renewable energy. However, I see several problems with this approach to reversing global warming and restoring a livable climate.

First, consider an ethical issue. There are already millions of people, most with tiny carbon footprints, who are being left homeless and becoming climate refugees. For them, climate change has already created an unlivable environment, so that the it's too late to say that we will reverse it by 2050.

Second, there is a practical issue. Fossil fuel use is still rising, and is too entrenched to be quickly phased out around the world. The renewable energy is supplementing the fossil fuels, but the fossil fuels are continuing to be burned and as the previous speakers have pointed out, the Paris accord is not on track to be met. Despite its stated aim to limit warming to well below 2°C above pre-industrial levels by having countries voluntarily reduce emissions of carbon dioxide and other greenhouse gases, the world is on track to exceed that threshold. Even 1.5°C in warming is likely to lead to punishing environmental impacts and widespread displacement. And even if we COULD give up fossil fuels right away, our planet is ALREADY too hot and too dry to maintain a livable climate.

The Role of Water.

Fortunately, the role of fossil fuels is only part of the story of climate change, and the news media are beginning to report on the role of water. Water vapor is Earth's dominant greenhouse gas, and water governs 95% of the heat dynamics of our blue planet. So, while phasing out fossil fuels is crucial to solving the energy crisis, that alone cannot solve the climate crisis - we have to consider the role of water. But is not easy to model the effects of water, because it's not spread out evenly in the atmosphere the way the other greenhouse gases are. Water evaporates and then comes down as rain, and it has complex and variable effects on the temperature. If clouds are present at night, it tends to keep the heat in the atmosphere, while if clouds are present during the day, it tends to cool the earth. While water vapor is the dominant greenhouse gas, it is not the gas which is forcing the rise in temperature because it comes and goes.

Among the 17 Sustainable Development Goals promoted by the United Nations, access to safe drinking water and sanitation, Goal 6, is foundational to achieving any of the other goals. Limiting global warming to 1.5°C compared to 2°C would approximately halve the proportion of the world population expected to suffer water scarcity, although this varies between regions. Thus, restoring a functional water cycle is key to regional human sustainability.

Water is the limiting factor in regions that have an annual dry season, called drylands. During the rainy season, plants absorb and store water, and water soaks into the ground, maintaining a fertile, living soil that supports the ecosystem through the dry season. But 40% of Earth's land has a poorly functioning ecosystem, it has been degraded by overgrazing or removal of wood, or irrigation that made the soil salty. This kills the soil life, and hardens the ground, so rain doesn't sink in. Rain causes flooding and erosion followed by drought and the land becomes barren. The United Nations finds this situation in half of earth's land area. The good news is that ecosystem restoration is not complicated, and nature revives surprisingly fast. When the water cycle is restored, biodiversity of plants and animals increases, the ecosystem cools the area and sequesters carbon in the soil, where it can build up over time. That's the new climate solution: restore a functioning ecosystem. But does it really work?

It is well established that forests generate their own rain clouds, forming a water cycle that sustains the forest ecosystem. In addition, water vapor released by trees can travel in high altitude aerial rivers hundreds of miles. So, cutting down trees not only affects the climate in the forest, but may also cause drought in other places. This may explain the unusual and prolonged drought in Sao Paulo, Argentina, south of the Amazon rainforest, where the airborne water over the Amazon Forest is more massive than the water flowing in the river itself. For many years, Brazil was cutting that forest extensively. Recently, with new leadership, they have stopped that deforestation, and the drought in Sao Paulo has begun to let up. So, is this a coincidence or is this cause and effect? There are plenty of climate scientists beginning to look at that right now.

The COP27 climate summit held in late 2022 served to focus the world's attention on the steps necessary to avert catastrophe - including focusing on the interaction between climate change and water. The outcomes of the many consultations on the link between water and climate at COP27 were discussed at the United Nations Water Conference, held on 22-24 March 2023 at

the UN Headquarters Pacific Institute Water Think Tank. A key takeaway was that water and climate are cross-cutting issues, interlinked with biodiversity.

"Biodiversity for a Living Climate" based in Cambridge, MA, which has been working to gather information about the many, many projects that are taking place around the world. They start with the idea that only nature has the ability to both cool the planet and lower greenhouse gas levels. So healthy ecosystems full of biodiversity create direct cooling effects for our hot planet. Put simply, more nature, less heat. Keeping water in the ground supports plants, crops and people. Planting for biodiversity creates healthy ecosystems. Forests sequester carbon and use water vapor to move heat away from the earth. Regenerative agriculture works with nature to restore agro-ecosystems. Cover crops restore a functioning soil ecosystem during fallow periods. Holistic Planned Grazing uses domestic animals to mimic the effects of wild animals on grasslands to restore the soil ecosystem on land degraded by overgrazing. Reserving areas for native plants, eco-preserves, supports pollinators and other beneficial insects close to croplands.

The new climate story needs to focus on Earth's biosphere as a global ecosystem, where everything and everyone is interconnected. Earth's biosphere is humanity's only home, and we need to focus on some long overdue housekeeping. Earth repair is low tech and it's happening in many places all over the world. Only a climate solution that prioritizes the web of life will create a livable climate for all.

Land Degradation

How does land degradation impact climate change? It decreases the soil's ability to store carbon. Moreover, when forests are cleared or burnt, they release the carbon they have stored. A 2018 UN report found that deforestation alone contributed about 10 per cent of all human-induced greenhouse gas emissions.

Today, up to 40 per cent of the world's land surface has been degraded including 30 per cent of its cropland and 10 per cent of its pastureland. In the last fifty years, the area of drylands in drought has increased on average by more than 1 per cent per year — affecting mostly countries in Africa and Asia. If we continue to misuse our land, we could degrade a surface area as vast as the size of South America by 2050. When land is degraded, it impacts food security, water availability and ecosystem health, directly affecting half of humanity, and causing a loss of about US$40 trillion worth of ecosystem services each year — nearly half of the global GDP of $93 trillion in 2021.

Land degradation is also considered "the single greatest cause of terrestrial biodiversity loss," resulting in the destruction of the habitats of many animals and plants. Severe degradation such as drought and desertification can also devastate communities, leading to social and economic instability. Up to 250 million people could be displaced by 2050 as a result of climate change-induced desertification.

Thousands of years of plowing, coupled with today's use of chemical fertilizers and pesticides, have killed the soils, destabilized the water cycles, polluted the oceans, and poisoned our food. agriculture is also the answer. Solutions come from farmers, scientists, and activists who are working to save the soils and bring back healthy communities through ecological farming. These people represent a movement toward sanity.

Life sustains the climate.

The activities of all the organisms on the planet regulate the temperature. Soil is the living tissue of the Earth. It nurtures complex biodiverse eco-systems that include everything from bacteria to trees to us. Across the planet, concrete, asphalt, dead land, and bare ground now bake in the sun rather than absorb solar heat into cool and moist natural growth. For centuries now, human practices have been destroying the buffering and recycling provided by rich biodiverse landscapes. But it is fixable. We need to restore ecosystems. Many people are doing that. From large scale government efforts to locally focused restoration projects, people are learning to work with the natural cycles to undo the centuries of damage we have done to Earth's environments – damage that contributes to the climate crisis.

Ecological approaches to reversing climate change.

John Feldman's 2023 documentary "Regenerating Life**"** takes an ecological approach to unraveling the climate crisis. He challenges the prevailing wisdom that carbon emissions from the burning of fossil fuels are the primary cause of this crisis, which can only be mitigated by regenerating the complex system that maintains and regulates the climate. The goal is to restore the Earth by restoring the food system through a basic understanding that "the more you nurture the land, the more the land will nurture you." He gives us this wonderful thought:

"So here we are, living in cities and suburbs, suffering from flooding, worried about trees falling on our electric wires or wrecking our house. We seldom think of ourselves as members of a natural ecosystem. Even when deer come around and eat our flowers. But regeneration can begin in your own yard or in a local park."

Judith Schwartz is a journalist who traveled around the world looking at different projects that were taking place around the world where restoration of ecosystems was being done at a very grassroots level. All the way up to the World Bank sponsoring an ecosystem regeneration project in China that was the size covering an area the size of France. Camerman and ecologist John S. Liu describes the approach as "Dressing the landscape: Hilltops need hats, so plant trees; Hills need belts, so make terraces; The base of hills need shoes, so build dams". As shown in his film "*Lessons of the Loess Plateau*", the plateau's ecosystems were revitalized, lifting millions of people out of poverty in less than 10 years. The regrown ecosystems also absorbed a lot of carbon and restored watersheds, and reduced the impacts of global warming (see Xing et al., 2023 for a formal article describing the project). John Liu has made other documentaries showcasing work to revitalize droughted lands in China, Jordan and Ethiopia. This shows not just small things taking place, but really recovering ecosystems in desertified areas.

Gabe Brown's book "D*irt to soil : One Family's Journey into Regenerative Agriculture*" talks about a family's journey in the Midwest. The Brown's Ranch model, developed over twenty years of experimentation and refinement, focuses on regenerating resources by continuously enhancing the living biology in the soil.

George Monbiot's book *Regenesis* looks at different places around the world where this kind of regeneration is happening: a fruit and vegetable grower revolutionizing our understanding of

fertility; breeders of perennial grains, and scientists pioneering new ways to grow protein and fat. They show how the tiniest life forms could help us make peace with the planet, and restore its living systems.

Hannah Lewis's book "*Mini-Forest Revolution: Using the Miyawaki Method to Rapidly Rewild the World* " describes a new way for people in urban environments to cool the area and create biodiversity by developing a forest ecosystem on an empty lot or an area the size of a couple of tennis fields. She talks about 20 or 30 different places around the world where these mini forests are beginning to take place. It's a technique developed by the Japanese botanist Akira Miyawaki in the 1970's in response to Japan's rapid post-war development. Because the trees are planted very close together, they compete for light and they grow tall, so you end up with a mature forest in 20 to 30 years rather than 100 years or 200 years.

It's taken a long while for mini forests to make it into the United States, but here are two examples. Danehy Park Miyawaki Forest was planted on September 2021 on a landfill in Cambridge, MA. After one year the trees were no taller than the people, but 2023 (after the saw the second full growing season) saw "a massive amount of change. Between January and October, the height of the canopy increased dramatically, and the density filled out, creating a dark, moist interior to the forest that began to naturally suppress encroaching growth. Maintenance has still been helpful around the forest edge, but the ecosystem is developing very nicely and biodiversity, from insects and birds to invertebrates and small mammals, is thriving".

And here is a local example. The City of Summit Tiny Forest is a multi-layered forest of native plants located on 11,000 square feet behind the Community Center. It was planted in 2022 using the Miyawaki Method and is designed to become self-sustaining after two to three years and fully developed in 20-30 years. A lovely write-up by Jordan Akers (2022) in Civic Story describes the project, which includes indigenous medicine garden, a project spearheaded by Christina Perez, then a senior at Seton Hall University.

So, the point is that yes, we do need to stop burning fossil fuels, but that alone is not going to solve the question of climate change. We really need to approach holistically the regenerating of the ecosystem of the biosphere, and really it involves restoring the water cycle because the earth is currently too hot and too dry to really support a livable climate.

Bibliography

Akers, Jordan (2022). "Tiny Forest, Big Vision." Civic Story, August 1, 2022. https://www.civicstory.org/reporting/2022/7/26/tiny-forest-big-vision

Brown, Gabe. 2018. *Dirt to Soil : One Family's Journey into Regenerative Agriculture*. White River Junction Vermont: Chelsea Green Publishing.

Danehy Park Miyawaki Forest. N.d. https://bio4climate.org/miyawaki-forest-program/danehy-park-forest/

Feldman, John. 2023. "Regenerating Life: How to Cool the Planet, Feed the World, and Live Happily Ever After." (Documentary Film). https://bio4climate.org/regenerating-

life/#:~:text=Regenerating%20Life%20is%20a%20three,in%20a%20whole%20new%20light.

Jehne, Walter. 2018. "Restoring Water Cycles to Naturally Cool Climates and Reverse Global Warming." https://vernoux.org/agriculture_regenerative/Jehne-Restoring_water_cycles_to_naturally_cool_climates_and_reverse_global_warming.pdf

Lewis, Hannah. 2022. *Mini-Forest Revolution : Using the Miyawaki Method to Rapidly Rewild the World*. White River Junction, Vermont: Chelsea Green Publishing.

Liu, John D. 2022. "Regrowing China's Loess Plateau." Documentary https://www.allcreation.org/home/regrowing-loess-plateau

Monbiot, George. 2023. *Regenesis*. Penguin Books.

Schwartz, Judith D. 2016. *Water in Plain Sight: Hope for a Thirsty World*. New York: St. Martin's Press.

Schwartz, Judith D. 2020. *The Reindeer Chronicles: And Other Inspiring Stories of Working with Nature to Heal the Earth*. White River Junction, Vermont: Chelsea Green Publishing.

United Nations Climate Action. N.d. "Land - the Planet's Carbon Sink." https://www.un.org/en/climatechange/science/climate-issues/land?utm_campaign=weekly-planet&utm_source=newsletter&utm_medium=email&utm_content=20231025&lctg=618474151e05a77bbe414b07&utm_term=The%20Weekly%20Planet#:~:text=Without%20efforts%20to%20restore%20and,current%20annual%20greenhouse%20gas%20emissions

United Nations Sustainable Development Goal 6 (Water and Sanitation): https://www.un.org/sustainabledevelopment/water-and-sanitation/

United Nations UN 2023 Water Conference. 22-24 March 2023, New York, NY. https://sdgs.un.org/conferences/water2023

United Nations 39th UN Water Meeting, 12-13 March, 2024, Rome, Italy. https://www.unwater.org/

Xing, Jiacheng., J. Zhang, J. Wang, M. Li, S. Nie, and M. Qian. 2023. "Ecological Restoration in the Loess Plateau, China Necessitates Targeted Management Strategy: Evidence from the Beiluo River Basin." *Forests* 14 (9), 1-25. doi:10.3390/f14091753.

CLIMATE CHANGE AND ECO-SOCIAL WORK

Seton Hall University Faculty Seminar on Climate Change

November 3, 2023

Jared Best, M.S.W., Ph.D.
Assistant Professor, Department of Social Work.

My presentation frames climate change as a social justice issue, and how social work responds to climate change through environmental social work, ecological social work, or simply eco-social work. I will start with the example of a neighborhood in the Bronx called Mott Haven, which is referred to as Asthma Alley. Four of the seven Bronx neighborhoods have 30% of the population living below federal poverty level (NYC Health Epi Data Brief, 2021). Historically, children residing in the Bronx have consistently experienced higher rates of asthma-related emergency department visits and hospitalizations compared with all other New York City boroughs. Bronx public schools have a higher percentage of children with active asthma compared with most public schools across the US, and certainly all NYC public schools from other boroughs combined (12% vs. 9%; NYC Health Epi Data Brief, 2021).

One reason for this is that residents are inhaling emissions from hundreds of trucks that are driving in and out of a Fresh Direct warehouse located in the Bronx. Of the 1,000 or so Fresh Direct daily truck trips, the vast majority are serving wealthier neighborhoods in Manhattan and Brooklyn. There is also a printing press for the Wall Street Journal, a parcel depot, and a sewage works not far away from these neighborhoods. There is constant traffic going in and out of the Bronx on four nearby highways. Mott Haven has been nicknamed Asthma Alley because it has some of the worst pollution levels in the United States, and residents are hospitalized because of asthma at five times the national average, and 21 times higher than affluent NYC neighborhoods (Orellana et al., 2022; Restrepo & Zimmerman, 2009). Ninety-seven percent of the population is Hispanic or Black making this a classic example of what is called pollution inequity. To illustrate pollution inequity in this country, Black Americans are exposed to 56% more pollution than is caused by their consumption and Hispanic Americans are exposed to 63% more pollution as caused by their consumption (Tessum et al., 2019). By contrast, non-Hispanic white folks are breathing about 17% less pollution than they cause, meaning they have a pollution advantage.

South Bronx was not always called Asthma Alley. It was a thriving community until urban planner Robert Moses designed the Cross Bronx Expressway, built between 1948 and 1963. It completely bisected the neighborhood and has been a structure of environmental racism contributing to chronic health issues in this borough for decades now. Social work focuses on people in their environments, trying to improve the fit between a person and their environment, both by working with individuals as well as confronting systemic and structural issues. Ecological systems theory provides a model that many social workers use to illustrate a person's context or environment (see Figure 1). I will discuss the relevance of ecological contexts to climate justice and eco-social work, but first I will frame climate change as a social justice issue by offering a little background information.

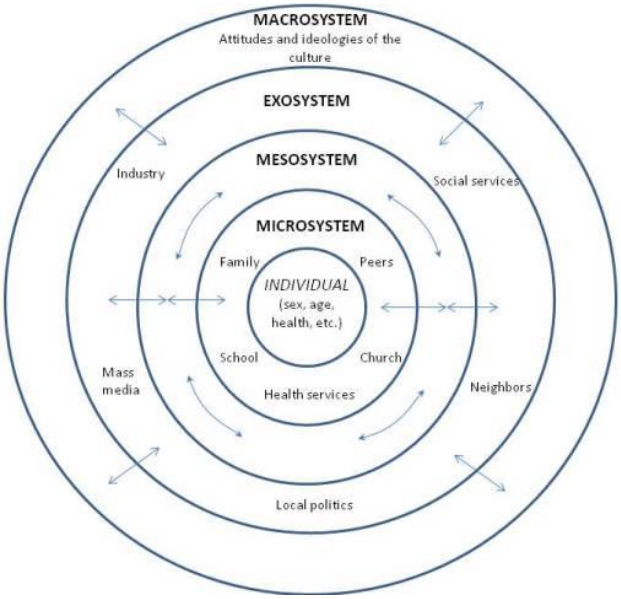


Figure 1 – Bronfenbrenner's ecological systems model; Source: Hchokr at English Wikipedia
https://en.m.wikipedia.org/wiki/File:Bronfenbrenner's_Ecological_Theory_of_Development_(English).jpg

Another area of focus for social workers is social determinants of health. These are the environmental and structural factors that influence health and health opportunities such as active ageing, which includes optimizing opportunities for health, participation and security in order to enhance quality of life as people age. Social determinants of health refer to education, employment, housing, access to healthcare, and income. Some illustrations of how these social and structural factors influence health and health outcomes include heterosexism and homophobia, misogyny, racism, poverty. These social and structural issues have a direct impact on a person's physiological well-being.

One classic example of racism as a social determinant of health is the school to prison pipeline. Black and Brown boys specifically are disproportionately targeted for behavioral issues in school, which effectively funnels them out of public-school systems into juvenile justice, and then later into adult criminal systems. Another example is disproportionate rates of homelessness among 2SLGBTQIA+ youth. Young queer folks are frequently forced to leave their homes (such as a parent kicking a child out) or choose to leave a house or community that is not affirming or supportive of their identity. Often, these young folks will move to urban centers, which are typically more inclusive, but where it is more expensive to live, often dropping out of school before earning a high school diploma. They might later earn a GED, but they are still excluded from traditional professional career paths and structures, thereby limiting access to benefits like pensions, retirement, employer-provided healthcare. Queer folks have historically had to patch together several part time jobs – without access to preventative healthcare to address the trauma we have experienced and without access to healthcare, we start to have chronic health conditions. These are just some of the ways that social and environmental conditions can directly impact health.

When we discuss the impact of social determinants of health, such as climate change, on life expectancy, these projections typically do not factor in natural disasters that are a result of climate change or new diseases that differentially increase mortality risks. Climate change threatens clean air, safe drinking water, sufficient food and secure shelter. Folks who live in core or working-class communities are disproportionately impacted by this. Each year, 21.5 million people around the world are forced to leave their homes as climate refugees as a result of natural disasters caused by climate change (Hooyman & Kiyak, YEAR). This is higher than displacement due to armed conflict, and higher than the displacement of being a political refugee. The Institute for Economics and Peace (2020) estimates that by 2050, 1.2 billion people will be forced from their homes as a result of natural disasters imposed by climate change. According to the World Health Organization (2023), between the decades of 2030 and 2050, a 20-year span, climate change is projected to cause an additional 250,000 deaths per year from malnutrition, malaria and heat stress.

Social work is committed to confronting climate change through eco-social work. Eco-social work moves beyond naming the now well-documented threats of climate change to a solution and activist-oriented framework aimed at mitigating the effects on an individual level, such as climate-informed mental health practice, to a structural and systemic level, such as policy advocacy and reform. This discussion focuses on the connection between climate change and social justice and explicates social work's commitment to confronting climate change through the growing subfield of eco-social work.

The National Oceanic and Atmospheric Administration (NOAA; 2022) states that since 1901, global temperatures have risen about 1.8°F (1°C), sea level rise has increased from 1.7 mm a year throughout the 20th century to nearly double that, 3.2 mm per year, since 1993. The thickness of 30 glaciers has decreased by more than 60 feet since 1980, sea ice coverage in the Arctic has shrunk by 40% since the Industrial Revolution, and on average, snow melts much earlier each calendar year. Melting snowpack affects water, food, and infrastructure. In addition to earlier snow melts, abnormally heavy precipitation across most of the United States has increased flooding while droughts are simultaneously more common, particularly in the Western US. Drought cycles and increasing temperatures related to climate change mean plants transpire more water causing farmers to rely on dwindling water resources to keep crops alive. Additionally, earlier snowmelts, which create fresh water for people to use, as well as less snow overall, means snowpack is becoming a less reliable source of water during dryer seasons.

Because agriculture has been so profoundly impacted by climate change, farmers and researchers are attempting to adapt, but increased temperature, drought, water stress, disease, other extreme weather conditions are not only creating challenges to grow and produce food, but human farm workers are suffering from heat related health issues like exhaustion, heatstroke, heart attacks and rising temperatures and heat stress are impacting animal livestock (NOAA, 2022). In addition, infrastructure is weaker in more impoverished and more densely populated areas. Infrastructure includes things like bridges, roads, electrical grids, transportation, and communication systems. Most of these systems are designed to be in use for decades, but many communities have infrastructure that was designed without climate change in mind. It is often

impossible to recreate an entirely new infrastructure that accounts for the impact of climate change, so a lot of infrastructure repairs end up being patchwork, and vulnerable to events like heavy rain, flood, wind, and snow. Temperature changes can stress these structures so increased temperatures require more indoor cooling, which puts a lot of stress on the energy grid. Heavy rainfall can shut down highways, and flood major businesses and homes. We witnessed this type of flooding here in Brooklyn and lower Manhattan this past year.

Nearly 40% of the US population lives in coastal counties, which means millions of people are being impacted by sea level rise and coastal infrastructure, including roads, bridges, and water supply (NOAA, 2022). This is leading to coastal erosion through high tide flooding. Projections say that by 2100, some communities are projected to end up at or below sea level (NOAA, 2022) This means that although the US is better off than some places in the world, 40% of the US population living in these coastal counties are going to be displaced and will have to make decisions about where they retreat to and how they adapt to climate change. Some people have more options and more resources than others to accommodate that.

Climate change also contributes directly to mental health challenges and physical health stressors including trauma, anxiety, PTSD, asthma, COPD, infection, and malnutrition. Figure 2 (Howard et al., 2023) illustrates climate change-related impacts on health and health systems with specific examples of how these consequences of climate specific climate change play out in each of these systems.

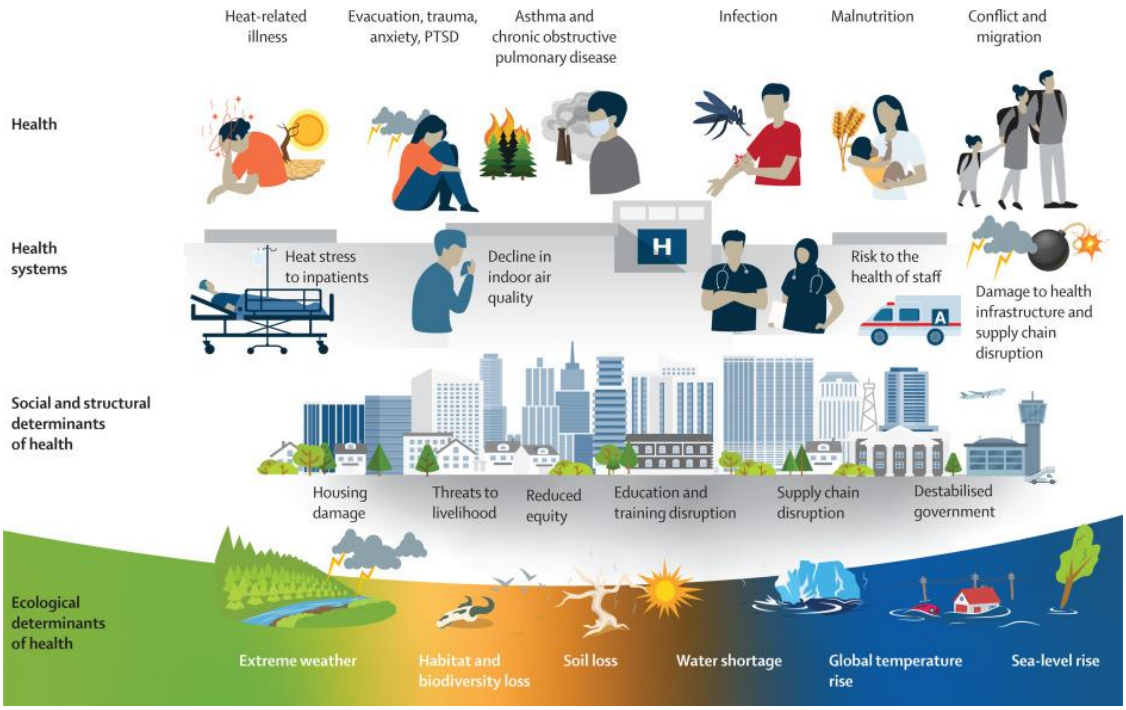


Figure 2, Climate change-related impacts on health and health systems (Howard et al., 2023; open access).

Part of the dominant discourse of mitigating the impacts of climate change invokes personal choice as a way to reduce individual contribution and refers to decisions we make in our everyday lives. While this can be helpful, it perpetuates the myth that climate change is solely individual responsibility. And while certainly there are decisions that I try to make in my daily life, I want to be wary of shaming, shaming people into doing things differently and living life differently, because the reality is that all although we can make individual decisions, climate change is not an individual level phenomenon. Overall, 100 of the most polluting companies contribute to 71% of worldwide emissions (CITE). The largest contributors to climate change will be the least impacted by it and those who are most impacted by climate change are the smallest contributors. Thus, in addition to individual efforts, what would have a bigger impact on confronting climate change is a more coordinated global approach by healthcare in transforming health facilities to become institutions of sustainability, thereby shifting social norms and policy (Howard et al., 2023).

Social work stands to play a major part in advocating for this type of macro-level change. In 2016, the National Association of Social Workers, the NASW, which is the field's largest professional association, proposed 12 grand challenges. In July of 2020, they proposed a 13th Grand Challenge, to eliminate racism, in response to our increased national attention on racial injustice against Black folks (or, more specifically, police violence against Black communities). Several of these 13 grand challenges for social work and social workers address the consequences of climate change and climate as a social justice issue. Specifically, eco-social work aims to address the disadvantages that marginalized and disenfranchised communities experience as a result of climate change.

Figure 3 is an eco-social adaptation of the ecological systems model illuminates what social work looks like at every level. The microsystem is the most common type of social work and includes individuals and families, addressing interpersonal and intrapersonal issues. Therapy is a classic example of micro-level social work, and most therapists and counselors are social work educated (as opposed to degrees in marriage and family or community counseling, psychology, or other allied disciplines). The mesosystem includes relationships between the microsystem (individuals and families) and the settings in which they participate, such as home, school, work, and social life. Social work at this level includes working with neighborhoods, schools, local organizations through community organizing or nonprofit management, or practice at the institutional level that focuses on cultural change. The exosystem includes family, mass media, workplace. The macrosystem includes the larger cultural context - socioeconomic status or social class social beliefs and values, ideology, and laws, all factors that indirectly influence individuals. Social work at this level includes lobbying, statewide activism, and social policy change. Additionally, social work research is also macro-level social work. This level of social work is what distinguishes this profession from professions like psychiatry or medicine. The chronosystem refers to time and temporality across an individual’s lifespan, or rather, historical context. Examples of phenomenon in the chronosystem include the terrorist attacks of September 11th the global pandemic of COVID-19 - very specific historical events that impact our lives. Finally, the ecosystem, is used to indicate the constant presence of the Earth's natural resources like weather, climate patterns, pollution, air quality, water quality, ecological biospheres like

mountains, rivers, hills, right, and all coexisting non-human living organisms like animals, insects, trees, coral reefs, plants, vegetation.

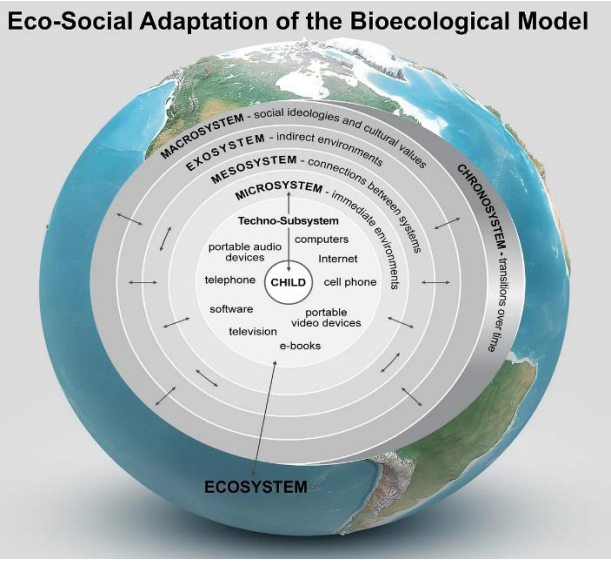


Figure 3. Source: https://ecosocialwork.wixsite.com/ecosocialwork/blank

Asthma Alley provides several compelling examples of eco-social work at multiple different levels. Neighbors, neighborhoods, and various other communities like women, ethnically and racially minoritized and oppressed groups, and religious groups are mobilizing in the Bronx. Efforts include alternative proposals, official complaints and petitions, public campaigns, street protests and marches, and appeals to determine the economic worth of the environment. Locust Point residents are petitioning city leaders to close the entrance of the Throgs Neck Bridge during peak hour due to unmanageable congestion for local commuters (Sequeira, 2021). Three teachers at a high school in South Bronx have started teaching 9th and 10th graders about environmental racism and the impact of climate change (Colon, 2023; Fregni, 2022). Three students last year, 16-year-old students Jasmine Pena, Juan Grian, and Rihanna Podes, spent several weeks working on a class project investigating a proposal from several local politicians and community activists to put a green space cap over the highway in an effort to improve air quality and quality of life for nearby residents. Pena, Grian, and Podes began prototyping the project in April, 2022 and within weeks, the project started moving forward. By December, the US Department of Transportation awarded a $2,000,000 grant, which included a study of plans for the highway. The city plans on publishing this study in 2024 and will include short term and long-term ideas to re-envision the highway and reconnect neighborhoods that this highway has cut through.

Bibliography

Colon, Dave. (2023, May 18). Torres seeks fed backing for Cross Bronx capping. https://nyc.streetsblog.org/2023/05/18/u-s-rep-ritchie-torres-wants-federal-backing-for-potential-cross-bronx-capping

Fregni, Jessica. (2022, April 21). Students Combat Air Pollution in 'Asthma Alley'. https://www.teachforamerica.org/one-day/ideas-and-solutions/environmental-racism-south-bronx

Hooyman, Nancy R. & H. Asuman Kiyak (2018). *Social gerontology: a multidisciplinary perspective* (10th Ed.). Boston, MA: Pearson.

Howard, Courtney., MacNeill, Angela. J., Hughes, Fintan., Alqodmani, Lujain., et al.(2023). Learning to treat the climate emergency together: social tipping interventions by the health community. *The Lancet Planetary Health*, *7*(3), e251-e264.

Institute for Economics & Peace. 2020. Over one billion people at threat of being displaced by 2050 due to environmental change, conflict and civil unrest. https://www.economicsandpeace.org/wp-content/uploads/2020/09/Ecological-Threat-Register-Press-Release-27.08-FINAL.pdf.

National Oceanic and Atmospheric Administration [NOAA]. (2022, December 8). Climate Change Impacts. https://www.noaa.gov/education/resource-collections/climate/climate-change-impacts

NYC Health Epi Data Brief (2021, September). *Disparities among Children with Asthma in New York City*. https://www.nyc.gov/assets/doh/downloads/pdf/epi/databrief126.pdf

Orellana, R. E., Moradeyo, I., & Uzodinma, P. (2022). Decades in crisis: adapting a social-ecological framework to assess structural elements impacting asthma rates in the South Bronx. *Social Medicine*, *15*(1), 21-31.

Restrepo, C. E., & Zimmerman, R. (2009). South Bronx Environmental Health and Policy Study, Public Health and Environmental Policy Analysis: Final Report for Phase VI.

Sequeira, R. (2021, August 5). Locust Point residents petition to close busy expressway entrance. https://www.bxtimes.com/locust-grove-residents-petition-to-close-busy-expressway-entrance

Tessum, C. W., Apte, J. S., Goodkind, A. L., Muller, N. Z., Mullins, K. A., Paolella, D. A., ... & Hill, J. D. (2019). Inequity in consumption of goods and services adds to racial–ethnic disparities in air pollution exposure. *Proceedings of the National Academy of Sciences*, *116*(13), 6001-6006.

World Health Organization (WHO). (2023, October 26). Climate Change [Fact Sheet]. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health

LAUDATO SI' AND CATHOLIC SOCIAL TEACHING: HISTORICAL ROOTS, CONTEMPORARY GROWTH

Seton Hall University Faculty Seminar on Climate Change
November 3, 2023

Thomas Rzeznik, Ph.D.
Associate Professor, Department of History.

This presentation explores the place of *Laudato Si'* within the tradition of Catholic Social Teaching as it has developed since the late nineteenth century. In providing historical context for the themes and principles that inform Pope Francis's text, the presentation will discuss how Francis constructively applies those teachings to the modern ecological crisis. The presentation will call attention to some of the other broader historical developments within Catholic thought and action that have contributed to the church's ongoing reflection on the environment. It will conclude with some brief reflections on how the documents fit into an emerging vision of what it means to be a global church.

Fifteen years ago, I was asked to give a talk here at Seton Hall on the "Greening of American Catholicism." (I don't even recall the occasion.) The aim was to offer a survey of the church's efforts to promote environmental stewardship and sustainability. It was not an easy task. The literature on the topic was rather slim, and it was hard to find notable examples of Catholic moral leadership on the issue. I could find a statement from a bishop here or the pope there, but nothing that really added up to a comprehensive Catholic position on the environment. The topic stood on the margins of Catholic moral and social teaching. It was not yet an integral part of Catholic thought.

But that has since changed, most notably with the publication of Pope Francis's 2015 encyclical, *Laudato Si: On Care for Our Common Home.*[6] In it, Francis offers an impassioned reflection on the state of the environment and places the ethical demands squarely before our eyes. It is an appeal to action but also a framework for thinking about our social responsibility to the earth and to one another. But is this something entirely new? How does it fit within the larger trajectory of Catholic social teaching?

For this presentation, I would like to explore *Laudato Si'* place within the broader tradition of Catholic social teaching and discuss how Francis constructively applies older themes and principles to the modern ecological crisis. I will then conclude with some brief reflections on how the document fits into an emerging vision of what it means to be a global church.

Pope Francis was certainly not the first pope to speak on environmental issues. In 1990, Pope John Paul II offered a reflection on the topic in is World Day of Peace message. In the second part, he spoke of "The Ecological Crisis: A Common Responsibility." In it, he noted that "world peace is threatened not only by the arms race, regional conflicts, and continued injustice among

[6] https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

peoples and nations, but also by a lack of due respect for nature." In no uncertain terms, he declared "the ecological crisis is a moral issue."[7]

Pope Benedict XVI, referred by some as the "green pope" for his efforts to call attention to environmental issues, likewise called for renewed respect for creation. In his 2010 World Day of Peace message, he spoke about the "threats arising from the neglect—if not downright misuse—of the earth and the natural goods that God has given us. For this reason, it is imperative that mankind renew and strengthen that covenant between human beings and the environment."[8]

But I'd like to look a little further back – to 1891.

The development of modern Catholic social thought is traditionally traced back to 1891 with Pope Leo XIII's encyclical, *Rerum Novarum* (Of New Things).[9] Known as his great social encyclical, it outlined the church's moral response to the challenges of industrialization and free market ideology (or, perhaps more accurately, free market idolatry). Navigating between socialism and laissez-faire economics, it affirmed the right to private property but called on employers to respect their workers and to provide a "family wage." Leo recognized workers' right to organize and strike, and insisted that the state has a duty to protect the interests of labor.

Speaking not simply of charity, he called for structural reform. "The foremost duty, therefore, of the rulers of the State," he wrote, "should be to make sure that the laws and institutions, the general character and administration of the commonwealth, shall be such as of themselves to realize public well-being and private property." Moreover, he insisted, the state has an interested to care for all its citizens, whether rich or poor, and "whenever the general interest of any particular class suffers…the public authority must step in to deal with it." It was a call for social justice. It is infused with a language of the common good.

Rerum Novarum laid the foundation for subsequent social encyclicals. In 1931, Pope Pius XI issued *Quadragesimo Anno*, whose title is a direct reference to the 40th anniversary of *Rerum Novarum*. Written in the midst of the Great Depression, it called for a reconstruction of the social and economic order.[10] In 1991, Pope John Paul II issue *Centesimus Annus*, on the 100th anniversary of *Rerum*.[11] Along with other encyclicals like Pope John XXIII's *Pacem in Terris* (Peace on Earth) and Pope Paul VI's *Populorum Progressio,* which spoke of the need to promote "integral human development," these writings provide a body of teachings that guide the Catholic response to social issues, from labor and economics, war and peace, and the right ordering of society.[12]

---

[7] https://www.vatican.va/content/john-paul-ii/en/messages/peace/documents/hf_jp-ii_mes_19891208_xxiii-world-day-for-peace.html

[8] https://www.vatican.va/content/benedict-xvi/en/messages/peace/documents/hf_ben-xvi_mes_20091208_xliii-world-day-peace.html

[9] https://www.vatican.va/content/leo-xiii/en/encyclicals/documents/hf_l-xiii_enc_15051891_rerum-novarum.html

[10] https://www.vatican.va/content/pius-xi/en/encyclicals/documents/hf_p-xi_enc_19310515_quadragesimo-anno.html

[11] https://www.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_01051991_centesimus-annus.html

[12] https://www.vatican.va/content/john-xxiii/en/encyclicals/documents/hf_j-xxiii_enc_11041963_pacem.html; https://www.vatican.va/content/paul-vi/en/encyclicals/documents/hf_p-vi_enc_26031967_populorum.html.

As I tell my students, Catholic social teaching does not lay out a concrete response to every social issue. It does not dictate specific policy. Rather, it establishes the principles that are to inform our decision making. These include:

- The recognition of the inherent dignity of every human person
- The promotion of the common good
- A preferential option for the poor
- A right to participation in the economic, political, and cultural life of society
- Solidarity and Subsidiarity
- The promotion of peace

Traditionally, these have been applied to the economic and social sphere. But with *Laudato Si*, we see Francis extending these principles into the environmental realm.

He begins the encyclical by speaking of the earth as our sister, who has been harmed by our actions. He says that the "earth herself, burdened and laid waste, is among the most abandoned and maltreated of our poor."[13] This personification of the earth is more than just poetic license. Rather, Pope Francis deliberately endows the Earth with personhood, thereby granting it the same inherent dignity and fundamental rights as others. This is a shift in Catholic moral thinking and social imaginary, that previously drew a sharp distinction between humans and non-human nature. Now the earth stands as one of us. And notably, she stands as one of the poor, who have a special claim on our moral consideration.

Francis draws heavily on the principles of Catholic social teaching throughout the document. In section 13, he speaks of the "urgent challenge to protect our common home" – one of many invocations of the "common good" that infuse the piece.[14] In section 14, he speaks of the need to advance "a new dialogue…a conversation which includes everyone."[15] That speaks to the importance of the principle of participation. All have a right to a voice in decisions that affect them, especially at the local level. In that same section, he says we need a "new and universal solidarity." He then speaks of the need to lay out guidelines for "human development" – ones that recognize the "intimate relationship between the poor and the fragility of the planet" and that resist "the throwaway culture."[16]

There is a great richness to the letter. I am struck by his insistence that we owe an "ecological debt" to the developing world and our obligation not only to limit our consumption, but also help those countries in sustainable development. He speaks powerfully and prophetically about the "globalization of indifference" that poisons us and urges us to change not only our lifestyle, but our outlook. The environmental crisis is an ethical crisis, and it is one that we can only solve if we develop the capacity to care for the earth and for one another.

---

[13] *Laudato Si',* §2.
[14] *Laudato Si',* §13.
[15] *Laudato Si'*, §14
[16] *Laudato Si'*, §16.

So how did Pope Francis come to find his voice on the environment? In a way, he listened. He listened not only to the cry of the earth, but also to the cries of his fellow bishops and all those within the church.

Here, I want to call attention to one of the striking features of *Laudato Si*: the footnotes. They reveal how Pope Francis has heard those who have been calling out from all corners of the globe. He cites statements from the Southern African Bishops' Conference, the Bolivian Bishops' Conference, the Latin American Bishops, the Paraguayan Bishops, the New Zealand Bishops, the Bishops of Appalachia, and many others. (Usually the citations flow in reverse, with local bishops citing the pope.) In effect, Francis is indicating that these concerns are not his alone. He is receiving the message coming from local communities all across the world. He has gathered them together, held them in his heart, and then gives voice to their concerns and appeals to us on their behalf.

The footnotes are atypical. Usually, papal encyclicals cite scripture, the catechism, and earlier papal statements. While *Laudato Si* is not devoid of those, the directional movement is from the bottom up, not the top down. Pope Francis is not trying to issue rules from HQ or central command, but rather receive and distill the concerns of those who have been affected by the ecological crisis we have face, especially those on the margins.

In this way, I think the encyclical reveals something about the way that Francis operates, but also his vision for the church. This month, delegates from across the globe are meeting in Rome for the synod of bishops. It is part of a multi-year process commonly referred to as the Synod on Synodality, a term that means "walking together." For Francis, the notion of synodality captures the spirit of the church, where all walk together toward "communion, participation, and mission." The synod is notable in the fact that its preparatory phases included listening sessions at the parish and local levels, which informed the reports submitted by local bishops' conferences. Information moves from the margins to the center. The voting members of the synod also include women and lay representatives for the first time. All are called to participate.[17]

Just as *Laudato Si* reveals Pope Francis's attentiveness to global environmental concerns, the synod reveals his desire to hear from all corners of the church. He is letting their concerns shape the agenda. He wants members of the church to walk together in a process of discernment and discipleship. Likewise, he recognizes that we cannot address climate change as individuals or even as individual nation-states. We need to come together, walk together, act together.

How can we model this in our own work as faculty and as a university community?

[17] https://www.synod.va/en.html

CLIMATE CHANGE, ZOONOTIC DISEASE, & ANTIMICROBIAL RESISTANCE: ADDRESSING WICKED GLOBAL HEALTH PROBLEMS WITH THE ONE HEALTH APPROACH

Seton Hall University Faculty Seminar on Climate Change
November 3, 2023

Michael Taylor, Ph.D.
Associate Professor, Department of Political Science & Public Affairs.

I am going to talk about One Health and how it may or may not be a good model for approaching climate change issues. The first thing will be what is One Health? It is an approach to public health policy that tries to look at human health, animal health, and environmental health all at one time and in a holistic fashion. It is the idea of integrating and unifying the health of people and animals and the environment in a sustainable way and trying to really pull together a lot of what Dr. Best was talking about earlier that is multisectoral and transdisciplinary, but also local, national, regional and global. It is not a new approach; there has been quite a bit of work done on One Health over time. If we go all the way back to the Greek physician Hippocrates (460 – c. 370 BC), there is a writing of his called "On airs, waters and places". He works through his observations that whether there is a lot of wind or a very stale area of water, and whether water is moving or whether water is stagnant, has a big effect on the health of a community. So, Hippocrates is making the connection between human health and environmental health.

Rudolf Virchow was a 19th century biologist who coined the phrase zoonosis, which is a disease that can be transmitted from animals to humans. Virchow held a very strong opinion that there should be no dividing line between human and animal medicine and that we should study both. More recently and probably the modern version of where One Health came from was a movement called One Medicine (Gyles, 2016). Calvin Schwab, who is at UC Davis, was a big proponent of this. He commented that there has to be more interaction between veterinary and human public health education. This morphed into what we now call One Health, where instead of just treating a disease, we are looking to prevent disease.

One Health advocates for promoting policies that will reduce environmental health issues, animal health issues and human health issues in a preventative way. The two areas that it has focused on primarily are zoonotic diseases and antimicrobial resistance, so I'm going to talk about those two things very briefly and then go through an example of how they fall into the climate change and the One Health model.

Let me start with zoonotic diseases. Today, 61% of known human infectious diseases are zoonotic. They can be transmitted from animals, and more interestingly - or more terrifying- is the idea that 75% of newer emerging infectious diseases that people will encounter are going to be zoonotic. This was very much on our minds during the COVID epidemic. The World Health Organization lists the emergence of either influenza or other infectious diseases as one of the top ten health risks for the globe.

The other thing I will talk about is antimicrobial resistance (AMR), which is also one of the areas that the World Health Organization lists among the top ten threats to global health. Antimicrobial resistance is the idea that we have infectious pathogens like bacteria and viruses, fungi, parasites, and that these microbes develop resistance to the medications that we have always used to treat people with them. Again, this is not a new idea. We have had antimicrobial resistance in the past due to overuse and misuse of antimicrobial medicines in both humans and animals, alongside the use of substandard medications and falsified medicines. But if we allow antimicrobial resistance to continue its trajectory, some of the costs are financial, and the human costs are huge. The Center for Disease Control (CDS) reports that currently 700,000 people per year die from AMR related illnesses, and those are projected to get to 10 million by 2050, when 28 million people globally will drop below the poverty line. They'll be a 7.5% reduction in livestock production worldwide, and a lot of other economic costs as well. So, what does all this have to do with climate change?

I framed this in the beginning as a “Wicked problem”. Wicked problems are problems that we face that are intertwined. They are complex. They defy definition. As soon as you define it one way and start to work on a policy to work on that, a new area pops up. Climate change is a good example of a Wicked Problem. As noted in previous talks, it has direct effects such as rising sea levels and increased temperatures, but it also is a driver and accelerator of many secondary effects, including zoonosis and AMR. While both have been around for a long time, climate change is accelerating and exacerbating them. That is primarily due to the deforestation and flooding that comes from the pressures of climate change, including loss of biodiversity and disruption of ecosystems. Warmer temperatures and more extreme weather create new habitats for microbes and increase opportunities to develop microbial resistance. This also increases the spread of vector borne human and animal pathogens. It increases pressure on food production and agricultural processes. It also allows insects that can transmit new diseases to move into new areas of the world as it gets warmer. These issues mostly impact people in the middle- and low-income countries of the world, but insects that transmit diseases can also move to New Jersey!

There are anthropogenic (human) reasons why we see overexploitation and climate change and global warming, but they do not go in one direction – the factors are interrelated. For example, climate change affects habitat loss, and overexploitation affects invasive species, and they interact with one another. That is one of the most difficult things about trying to talk about climate change – trying to carve out which pieces are going to be the focus. But loss of biodiversity is a huge issue.

We are in a sixth extinction period right now. It is hard to emphasize how great a crisis this is because we don't have great estimates of how many species we have or how many we are losing per year. There have been 1.4 million species named and classified, and between five and 30 million species that we have not yet identified, named or classified. The natural extinction rate would be somewhere between one to five species lost each year. But the current numbers of species lost each year due to human activities beyond the natural extinction rate is projected to be somewhere between 100 to 50,000 species per year. So why is this happening?
I'm going to focus on habitat loss, climate change and land use change. We are constantly

reshaping our land uses and most of it is going in one direction: from a natural state to a modified state of some sort. There is some rehabilitation going on, but it is minor compared to the other direction; on average each year land about twice the size of Germany has changed from one land use to another. It has been modified so that forest land becomes grazing land, for example, and that's been every year since 1960. This has a direct effect on zoonotic disease emergence.

Diseases are more likely to spill over from wildlife to humans in deforested and fragmented habitats. There are two effects here that affect zoonotic disease. The first is the dilution effect: less biodiversity gives less protection from emerging infectious diseases. When we lose habitat due to land use changes, we lose biodiversity. The species that disappear first tend to be specialist species such as apex predators and those with a slow life history that take a long time to reproduce and have long generations. When these species disappear, species with faster life histories that mature and reproduce quickly become dominant because they reproduce faster. These tend to be what we call reservoir hosts, that is, hosts of diseases. With more disease hosts, there are more opportunities for zoonotic disease to jump from animal species to human species, because we lose the dilution effect. The second is the coevolution effect, a hypothesis that wildlife hosts and disease-causing microbes that live within them undergo rapid diversification. To put it simply, there are more of them, and they spread and diversify rapidly. When you have a fragmented landscape that brings these hosts into proximity with humans, it increases the probability of any one of the microbes spilling over to human populations.

So, when we change land use and we have habitat loss, humans move closer to animal species, and have more interactions with them. Often those are novel interactions, and the species that remain are the ones that could be most likely to be reservoir hosts of emerging diseases. That is an environmental health problem relating to an animal health problem relating to human health problem.

Antimicrobial resistance is another serious problem. It is usually considered in terms of misuse and overuse of antimicrobial medicines. For example, agriculture is the huge driver of this. There is massive use of antibiotics farming. Antibiotics are administered wholesale to herds to protect them from possible disease and get them to market with more weight. China, Brazil and the United States lead the pack, and they're all increasing. Agricultural consumption of antibiotics is projected to increase through 2030. And this problem is not just land-based; it affects our oceans as well.

We have a lot of aquatic farms, raised fish and other types of seafood which has a huge effect on antibiotic resistance, largely due to antibiotics added to fishmeal to keep the fish healthier. All that antibiotic laden fishmeal rests at the bottom of the ocean and becomes sediment.so it becomes a massive reservoir of antibiotic resistant genes. This is further complicated by more human impact. For example, microplastics (things that we should be avoiding (that we flush down the drain end up everywhere. When we go through our municipal waste plants and waste treatment plants, they get activated by the sludge and become hosts for antimicrobial resistant microbes. Again, human activities are affecting animal health and then affecting environmental health and then circle coming back around. So, what do we do about this?

Well, New Jersey passed a law in 2022 that was the first in the country, it launched the One Health task force. I've been appointed by Governor Murphy to be one of three academics on the task force. The first focus and charge of the task force is zoonotic and vector borne disease detection, diagnosis and management. We are supposed to look at improving responses and recovery protocols for zoonotic disease outbreaks, and develop better diagnostic text tests for zoonotic vector borne and environmental diseases, and then try to develop Xeno surveillance tools. For example, drawing the blood from mosquitoes and testing it for pathogens, and detecting any human blood to see if there are pathogens in it. This is a kind of early warning surveillance system using mosquitoes used in quite a few countries in South America right now.

The second charge one is looking at antimicrobial resistance, including promoting and educating humans on the judicious use of antibiotics, especially for agricultural health professionals. We will be investigating antibiotic alternatives such as bacteriophage therapy - using viruses that kill bacteria and deploying those instead of the traditional antibiotic.

These two charges are biological, and I'm more interested in the third one, which is educational and outreach initiatives to promote One Health approach across the states, government agencies, academic and research institutions, nongovernment organizations and private entities. And then coordination and collaboration to address all the hazards. The issue with all of this is that it is an amazingly difficult prospect. And, we have not met yet!

Part of the problem is there is a fight between who should house the task force. The person who was going to be in charge of this was appointed to the New Jersey Department of Agriculture, and then there were representatives from the Department of Environmental Protection and the Department of Health. But the issue of who should be in control of it has raged on, and meantime there is a lot of work to be done. We need to start collaborating more. There's some great research on the biological factors, the chemical factors, the environmental science side of this, but what's really lacking is work from both the social sciences and the humanities. There is a need for us to inject into one health a greater perspective from the social sciences and the humanities, because the conditions that bring about all these biological mechanisms and cause antimicrobial resistance and zoonotic disease outbreaks, are social. They are human driven. So, we need measuring and modeling and creating of understanding of what we could do to change our social environment to address these problems. We have health equity issues, we have environmental equity issues, we have cross sectoral challenges, and none of this work is going to actually produce policy that's going to create changes until we start to think through that piece of it as well.

And that's where whether it is informed through Catholic social teaching or other bodies of ethics or moral considerations, we're going to have to figure out prioritization, even within the One Health. It has to be holistic, but it is important to decide what to address first, and make decisions about who should get the greatest consideration. That includes between environment, humans and animals. It is a huge challenge. I don't have any answers right now, but this something we can and should discuss.

Bibliography

Center for Disease Control. 2019. Antibiotic Resistance Threats in the United States. https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf

Gyles, Carlton. 2016. "One Medicine, One Health, One World." *The Canadian Veterinary Journal = La Revue Veterinaire Canadienne* vol. 57,4: 345-6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4790223/

Hippocrates. n.d. *On Airs, Waters, and Places*. . Translated by Francis Adams. Internet Classics Archive. http://classics.mit.edu/Hippocrates/airwatpl.html.

One Health Institute. N.d. "Calvin Schwabe Lectureship." UCDavis One Health Institute, School of Veterinary Medicine. https://ohi.vetmed.ucdavis.edu/education/calvin-schwabe-lectureship

Reardon, Sara. 2023. "Antibiotic Use in Farming Set to Soar despite Drug-Resistance Fears." *Nature: International Weekly Journal of Science* 614 (7948): 397. doi:10.1038/d41586-023-00284-x.

Verbanas, Patti. 2021. "New Jersey is the first state to legislate a task force to fight disease transmission from animals to people". https://www.rutgers.edu/news/rutgers-inspires-establishment-new-jersey-one-health-task-force

Winkler, Karina, Richard Fuchs, Mark Rounsevell, and Martin Herold. 2021. "Global Land Use Changes Are Four Times Greater than Previously Estimated." *Nature Communications* 12 (1). doi:10.1038/s41467-021-22702-2.

World Health Organization. N.d. "Ten Threats to Global Health in 2019". https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019

World Wildlife Federation. N.d. "Biodiversity". https://wwf.panda.org/discover/our_focus/biodiversity/biodiversity/

World Wildlife Federation. 2024. "What is the Sixth Mass Extinction and what can we do about it?" https://www.worldwildlife.org/stories/what-is-the-sixth-mass-extinction-and-what-can-we-do-about-it

THE LYNN WHITE THESIS AND THE WICKED PROBLEM OF CLIMATE LEGISLATION

Seton Hall University Faculty Seminar on Climate Change
November 9, 2023

Heinrik Z. Hellwig, Ph.D., Visiting Assistant Professor, Department of Philosophy.

First, I want to situate my topic within two core concepts. In fact, we started talking about them last week. These concepts are anthropocentrism and ecocentrism.

Anthropocentrism puts human beings on top of a pyramid, because it prioritizes human interests and human values above all else. Ecocentrism, on the other hand, places human interests among the interests of other nonhuman things—such as animals and plants and the like. But ecocentrism is not just about considering nonhuman things: it is also about moral consideration. So, let me define these terms more formally. Anthropocentrism is the view that only humans have intrinsic value. Nonhumans, which would include plants, soils, water, animals, even the ecosystem as a whole—all those things, according to anthropocentrism, have only instrumental value to human beings. We have no direct obligations to these things - they have value only insofar as they serve us. Ecocentrism, on the other hand, is the view that both humans and nonhumans have intrinsic value. So, on the question, "What value do nonhumans have?" anthropocentrism and ecocentrism are incompatible positions. But I tend not to focus on that point.

I look at anthropocentrism and ecocentrism more in terms of "what are our direct responsibilities to the natural world?" And if you focus on that, I think it's possible to think of anthropocentrism and ecocentrism as existing along a certain kind of continuum. At the far end of anthropocentrism, you say, "human beings have no direct responsibilities to the environment, to the natural world." The further away you drift from that, you get closer to ecocentrism. There are different versions of ecocentrism. What they look like will depend on how much value you want to give to human interests compared to non-human interests.

At the far end of ecocentrism would be a view like deep ecology, which, generically, says that humans and nonhumans have equal value. But you could have a version of ecocentrism which says, "OK, both humans and nonhumans have intrinsic value, but nonhuman interests do not weight very heavily against human interests." So, to borrow an example from Richard Burnor and Yvonne Raley, a mild version of ecocentrism might have it that a starving people could be permitted to turn some forest into farmland. I think they would stipulate that the harm we do to nature should be kept to a minimum and there should be no other option available. But this mild version of ecocentrism might say something like, "Where nature's interests and human interests conflict, we could justifiably weigh human interests heavier."

My project has to do with these ideas as they relate to environmental law and policy. Much of environmental law and policy is anthropocentric, but that's not very surprising, right? Because law is essentially human-centered. We make laws to create protections for human interests, and

since much human well-being depends on natural well-being so right, we make laws. For example, we have laws that forbid littering. We make laws requiring cars to get smog checks. These are laws that do create protections for human rights: in the littering case, it's property; in the smog check case, it's the harm of pollution. But these laws indirectly protect nature, too. We can also think of policies where we are trying to protect nature more directly. But the reason we usually do that, as in the littering case, is because we're trying to optimize resource use so that we can get the most value out of it for ourselves.

Now, that approach to policymaking is at odds with ecocentrism. So, I want to ask a question here that's going to guide the rest of the talk: What does good ecocentric law and policy look like, particularly regarding climate legislation? Last week's sessions, I think, gave us a couple of answers to this question. Professor Best's presentation on social work mentioned the decolonizing approach, where we incorporate indigenous perspectives on nature and the value of nature into our projects. Professor Taylor talked about the OneHealth program. I don't know whether it's fair or accurate to call OneHealth ecocentric, but the holism described in the OneHealth approach reminded me of a lot of the things that various ecocentrists embrace.

There are other approaches to policy in the literature, for example, the idea of Earth jurisprudence, which Cormac Cullinan defined in his important book, *Wild Law* in the early 2000s. The basic idea of that book was that we should recognize ecosystems as legal persons who have rights, which is not exactly a new idea. Even in the 1970s and '80s, people like Peter Singer and Tom Regan were pushing the idea that non-human animals have rights. In the 2020s such ideas are making a comeback. We have examples of cases where rivers are being legally recognized persons, such as the Whanganui River and New Zealand and the Atrato River in Colombia. Martha Nussbaum even has a new book about equal rights for animals. Now there are a lot of different directions you could go when it comes to this question about ecocentric law and policy. But once you go down one of these roads, you're going to start crossing into a number of important issues in different areas, which is how these fit into the concept of a wicked problem.

So back to my guiding question: What does good ecocentric law and policy look like? I am interested in this question as it relates to U.S. federal climate legislation and an important piece of intellectual history. Which brings me to Lynn White, Jr. White was a historian. He specialized in medieval history and spent the early part of his career at Princeton, but the bulk of his career was spent at UCLA, where he wrote *Medieval Technology and Social Change*, his best-known book and an important one for the history of technology subfield. In the area of environmental ethics, White authored this groundbreaking article in Science magazine in 1967 entitled "The Historical Roots of Our Ecological Crisis." He makes a lot of controversial arguments in that paper, and his focus is the role that religion has played here in certain environmental problems. White is very critical of Western Christianity's role as to environmental problems. White's article is difficult. It's a complex discussion that's compressed into five pages, and given that he's focusing on Christianity, you might think he was hostile

toward religion, but in fact, he wasn't. White was a Christian thinker, and this comes out more in his later work.

I want to focus on the 1967 article for the moment. Let's develop what I'll call "The Lynn White Thesis." As I mentioned, it's a complex discussion, but there's a lot of good scholarly writing which attempts to clarify White's argument. Todd Levasseur and Anna Peterson in particular, distill White's thesis into three main claims. The first claim is that ideological and cultural factors are the root causes of the ecological crisis facing contemporary humanity. At the time that White wrote his paper, the thinking was that environmental problems were mostly due to material changes and very rapid technological changes from the Industrial Revolution—that these classes of change are the main contributors to pollution and environmental degradation and the like. But White said, "Yeah, those are important. But there's a more fundamental cause here for these things, namely, people's beliefs and attitudes about the proper relationship to nature. Those are the driving factors behind ecological crisis." Which brings us to the second point: According to White, Western Christianity has been particularly influential in creating environmentally destructive attitudes. He argues that just as the fundamental causes of ecological destruction or religious, so too must their solution be religious.

Now I'm going to say a little bit more in a minute about what exactly that means. It's an equivocal point as presented. If you haven't read this paper before, or even if you have, one thing that stands out to me about it is the way in which it's written. There are numerous "mic drop" moments in this paper: White talks and talks and talks and then and suddenly there are some pithy remarks about the history of ideas that are, at the very least, memorable, but powerful enough that it will give you pause to reflect. Here are a few of the mic drop moments.

> "What shall we do about the crisis? No one yet knows, unless we think about fundamentals, our specific measures may produce new backlashes, more serious than those they're designed to remedy."
>
> "Our ecological crisis is the product of an entirely novel democratic culture. The issue is whether a democratized world can survive its own implications. Presumably we cannot, unless we rethink our axioms."
>
> "What people do about their ecology depends on what they think about themselves in relation to the things around them."
>
> "Human ecology is deeply conditioned by beliefs about our nature and destiny. What we do about our ecology depends on our ideas about the human nature relationship, more science and more technology are not going to get us out of the present ecological crisis until we find a new religion or rethink our old one."
>
> "Since the roots of our trouble are so largely religious, the remedy must also be essentially religious, whether we call it that or not, we must rethink and refill our destiny."

Remarkably, this short paper launched a vast and diverse scholarly response. So much has been written about "The Lynn White Thesis" and this little article. Let me come back to the Thesis as I sketched it a moment ago. I'm going to ignore the second point for the rest of this talk. I'm going to focus on points one and three in what follows, and I want to say a little more about the third point. What does he mean when he says that the solution must be religious? I don't think he's saying, "Hey, we need another organized religion to offset the harmful effects of Western Christianity." It seems to me he has a more expansive notion of religion here which, he thinks, needs to be guiding us if we're going to relate to the environment properly. And to back that up, I want to mention his two follow-up essays to the 1967 paper. He had one in 1973 called "Continuing the Conversation" and one in 1978 called "The Future of Compassion." Those essays give us more insight into what White means by a religious solution to environmental crises. Here's a good quote from the 1973 paper:

> "Nature dualism is deep rooted in us until it is eradicated not only from our minds but also from our emotions. We shall doubtless be unable to make the fundamental changes in our attitudes and actions affecting ecology. The religious problem is to find a viable equivalent to animism."

So, some framework where we're relating to nature as if it has a soul or as if trees and animals have souls. I don't think he's being literal about this here—but we need some sort of value system, some sort of replacement ideology that places the same kind of value on these things. In the 1967 paper, he gestures at Christianity possibly being able to do this. He ends the paper mysteriously, but he mentions that Saint Francis of Assisi should be the Patron Saint for Christians—that St. Francis should be the model for how Western Christianity should relate to the environment. White never really expanded on that point. But then, by 1978, you see he's talking in a way that sounds more and more as if he really means something like animism. Consider this quote from the 1978 paper:

> "We can sense our comrade ship with a glacier, a subatomic particle or spiritual nebula. Humanity must join the club of creatures. They may help save us from ourselves. Humans, too, are creatures with rights that must be balanced, but not merely on an anthropocentric pivot with those of his companion creatures."

To me, that language is pointing very strongly in the direction of ecocentrism. So, whatever this expansive notion of religion is, it's going to be underwritten by ecocentric values.

White does not discuss environmental policy at all in his 1967, 1973 or 1978 papers, but I'm going to build upon the question I started with by posing a new one. Suppose that we accept White's claims about the connection between ideological and cultural factors and environmental crises, and the need for a new religion. *Then*, what would a good ecocentric policy look like? You can give a lot of different answers to that question, but one working answer I have, and I

think this is interesting because it relates to the here and now, is that it probably wouldn't look like the Inflation Reduction Act—the climate legislation that the federal government passed a little more than a year ago now. Why not? Well, you know, if you just look at some of the press releases from government agencies—take the US Department of Treasury, for instance, their fact sheet. In really big print, it says **the IRA's tax incentives are ensuring all Americans benefit from the growth of the clean energy economy**.

So immediately, we're talking about human benefits of participating in clean energy projects, and on the same sheet, if you look a little further down on the graphic here, the language is pretty instructive.

"The Inflation Reduction Act is significant, not only because it tackles the climate crisis head on, but because it does so with economic opportunity at its core to build a clean energy economy that includes everyone."

So, the thing that's driving us here are economics and market values and efficiency and reducing costs—all human-centered things. And to be fair to the federal government, I will say that the news media spun the Inflation Reduction Act as President Biden's climate bill, but that is a little bit misleading. The Inflation Reduction Act is a budget reconciliation bill. We elect representatives to make decisions about how to spend tax dollars right for human purposes—to decide which programs are best going to benefit their representatives and society at large. So as a budget reconciliation bill, you should expect it to focus on human interests. But what's unique about the Inflation Reduction Act is, it's focusing specifically clean energy and environmentally friendly programs right and how that's the best way of spending taxpayer dollars, so that we as humans do benefit, but also at the same time, we are addressing the climate problem.

Here's some more language from government press releases. Again, right up front, the IRA is "historic climate action" and we're "investing in American to create good paying jobs and reduce costs." So, the benefit to us is amplified; it is the "largest climate investment in history." And there are some good things in here, no double. From the Department of Energy, they did some studies here about how the programs that got passed are going to lead to greenhouse gas emission reductions over the next several years. One way it's going to do that is by driving, right, significant new clean electricity generation. We're going to do more manufacturing to promote more clean electricity right from wind and solar, and over the next seven years, we expect twice as much wind, solar and battery deployment as there would have been without the Inflation Reduction Act. In addition, we're going to facilitate, or we already have, more electric vehicle sales, which will lower costs for families and boost clean energy manufacturing.

What about things that concern the ecosystem more directly? The NOAA has IRA funding for a bunch of projects that will make communities and local economies more resilient to climate change. The US Forest Service will award up to $1 billion in grants to inquiries, equitable access to trees and green spaces in urban and community forests where more than 84% of

Americans live, work and play. The Restoration and Resilience Framework from the Department of the Interior—they have plans to restore and protect our nation's lands and waters. As part of this effort, the Bureau of Land Management has allocated an initial $161,000,000 through the Inflation Reduction Act to restore ecosystems and revitalize local economies. The National Park Service also has plans to allocate funding for national parks in 39 states, presumably to revitalize ecosystems or sustain them there. The US Fish and Wildlife Service also has rebuilding and restoration initiatives. But the government is clearly talking about anthropocentric things.

We are emphasizing clean energy manufacturing investments: more than 70 billion in the electric vehicle supply chain and 170,000 clean energy jobs; spending 122 billion across more than 800 clean energy generation projects. In terms of lowering energy costs, this part really stands out to me – tax credits. Families who are installing more efficient technology in their homes – the government will effectively pay you to do it. If you want to start installing more efficient electric heat pumps, if you want to start installing rooftop solar and battery storage in your home, other energy efficient improvements like including more energy efficient doors, windows, etc., you'll receive tax credits. You'll also receive tax credits for buying an electric vehicle. If you buy a new EV, you can receive a tax credit up to $7500, and if you buy a used one, you can get up to $4000. I think somebody who has read Lynn White carefully might say, "OK, these might be good things." But White also mentioned that just throwing more technology, more science, and is not really addressing the problem.

So, I'm going to ask a question on White's behalf: What in this bill discourages anthropocentric thinking? Again, I grant that we should expect there to be some anthropocentric stuff given that it's a budget reconciliation bill. But when we're talking about anthropocentric thinking that concerns the environment, when you look through this bill, the answer appears to be: Nothing. There's nothing in this bill that discourages anthropocentric thinking, at least nothing directly. With this strong emphasis on investment in clean energy manufacturing, job creation, tax credits, cost reduction, economic growth and efficiency, et cetera., White might say that our focus is still all wrong. The climate section of the IRA is framed almost entirely in terms of how humans stand to benefit from taking part in climate friendly projects, and for reasons that have nothing to do with fundamental attitudes about ecology.

Another question that White or a strong proponent of "The Lynn White Thesis" might push is this. If we are just throwing more science and technology at these things, might this worsen the problem? I think it's plausible to think that White might say yes. Nothing in the IRA deals with the root cause, people's attitudes toward nature, and the energy savings portion may be particularly worrisome. By using tax credit incentives, you are effectively paying people to behave differently—but have they changed their anthropocentric attitudes? If they haven't, and you're conditioning their behavior here on what they stand to get, that might stand the wrong public message and foster more strongly egocentric anthropocentric attitudes over time—a "what's in it for me?" problem. If somebody knows they're going to be getting all these tax credits and that's really the part of the public message that sticks, soon you can get a lot of people

thinking, “OK, I'll do something that will help fight climate change. But what are you going to give me?” I think White would be concerned about that. I should add, it’s not obvious to me that White would oppose tax credits per se. I don’t have anything to go on there—nothing from the texts anyway. You may have people who are sincerely concerned to have more energy efficient homes and to do their part, but they may not be able to afford it on their own; that’s where tax credits can be helpful, but that's more of a prudential justification for using tax credits. If we're concerned about anything like a moral justification, we must go more fundamentally to anthropocentric attitudes.

This brings us to the final question I want to explore. Is the Inflation Reduction Act a bad environmental law? Per the Lynn White Thesis, I'm going to say no. I don't want to suggest something that strong. Nor do I think I have any basis for suggesting something that strong since he doesn't talk about policy. The IRA does have some good spending initiatives. There's some really good stuff in there about equity and environmental justice that I didn't touch on, and some of these things that we are funding with the IRA may be necessary given where we are in the climate crisis. But for White, the worry would be whether we are promoting, and being guided by, the right values with respect to the environment. The Restoration and Resilience framework from the Department of the Interior does allocate IRA funds to projects that are prima facie compatible with ecocentrism. But I don't see any evidence of the ecocentrism in this bill, and currently, the U.S. employs an “ecosystem services” system which is arguably incompatible with ecocentrism.

So where do we go from here? I am not sure. I’m stuck on the same question I brought up in the middle of the talk: Suppose we accepted White’s claims about the connection between ideological and cultural factors and environmental crises, and the need for a new religion in the more expansive sense. Then, what would good ecocentric policy look like?
Well, one possible answer is that given White’s claims about rights in his 1978 paper, I wonder if a “rights of nature” approach might be the best theoretical framework for environmental policy that reflects the Lynn White Thesis.

Bibliography

Burnor, Richard, and Yvonne Raley. 2022. *Ethical Choices: An Introduction to Moral Philosophy with Cases*, 3rd ed. New York, NY: Oxford University Press.

Conn, Charles and Robert MacLean. 2019. *Bulletproof Problem Solving.* Hoboken, NJ: Wiley Publishing.

Cullinan, Cormac. 2011. *Wild Law: A Manifesto for Earth Justice*, 2nd ed. White River Junction, VT: Chelsea Green Publishing,

Callicott, J. Baird. 2017. “The Historical Roots of Environmental Philosophy,” in Todd LeVasseur and Anna Peterson (eds.), *Religion and Ecological Crisis: The “Lynn White Thesis” at Fifty.* New York, NY*:* Routledge.

Pack, Justin. 2022. *Environmental Philosophy in Desperate Times.* Peterborough, Ontario*:* Broadview Press.

The White House. 2023. "Fact Sheet: One Year In, President Biden's Inflation Reduction Act Is Driving Historic Climate Action and Investing in America to Create Good Paying Jobs and Reduce Costs" (published August 16, 2023): https://www.whitehouse.gov/briefing-room/statements-releases/2023/08/16/fact-sheet-one-year-in-president-bidens-inflation-reduction-act-is-driving-historic-climate-action-and-investing-in-america-to-create-good-paying-jobs-and-reduce-costs/

LeVasseur, Todd and Anna Peterson. 2017. “Introduction,” in Todd LeVasseur and Anna Peterson (eds.), *Religion and Ecological Crisis: The “Lynn White Thesis” at Fifty.* New York, NY*:* Routledge.

U.S. Department of the Treasury. 2023. "Fact Sheet: How the Inflation Reduction Act's Tax Incentives Are Ensuring All Americans Benefit from the Growth of the Clean Energy Economy" (published October 20, 2023): https://home.treasury.gov/news/press-releases/jy1830

White, Lynn T. Jr. 1967. "The Historical Roots of Our Ecologic Crisis," *Science,* New Series 155 (3767): 1203-1207.

White, Lynn T. Jr. 1973. “Continuing the Conversation,” in Ian Barbour (ed.), *Western Man and Environmental Ethics: Attitudes Toward Nature and Technology.* Reading, Mass: Addison Wesley, 55-65.

White, Lynn T. Jr. 1978. “The Future of Compassion,” *The Ecumenical Review* 30 (2): 99-109.

CLIMATE ANXIETY: THE PERILS AND THE PROSPECTS.

Seton Hall University Faculty Seminar on Climate Change
November 9, 2023

Judith Chelius Stark, Ph.D., Professor of Philosophy and the Environment

Here is the context for my decision to work on this topic. At least five or six years ago, I realized that, given the age of our students, they have never lived during a time in which there have not been many serious environmental challenges. These challenges, and especially global warming, have been part of their lived experience for their whole lives. Now, whether they are paying attention to it or not, these environmental challenges have been there, at least as part of the background noise for them for their whole lives. Here are my suggested strategies.

First, pay attention to our students. As noted, for all of their lives, they have lived with climate challenges, either in the background or in the foreground of their awareness. The first step is to pay attention to their climate anxieties and also to our own because we should be anxious. As I wrote up the proposal for this seminar in July 2023, I was in my summer home in northeastern Nova Scotia. At that time, there were over 1000 active forest fires in Canada. Of course, Canada is a huge country (second largest in the world). Moreover, 90% of the Canadian population lives within 150 miles of the Canada-U.S. border. This is important to keep in mind since the Canadian north contains one of the largest boreal forests in the world (along with Russian Siberia). Most of these active wildfires were in very remote areas that are far from population centers and difficult to access and mitigate.

Given these facts, it is even more remarkable that the smoke from these fires reached our areas last June creating serious health hazards. I mention this one prominent instance of the effects of climate change in our immediate area as an immediate and visible sign of the times. Combine this event with the increases in extreme weather events, droughts, and flooding that have been occurring with more frequency and intensity around the globe and we have a sense of the future that awaits us. It is also important to note that the countries and populations hit the hardest by these climate disasters are the ones who did much less to contribute to the climate situation and who are much more vulnerable to its effects than we are in the (over-) developed world.

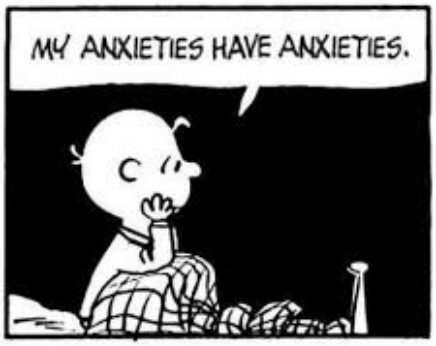
As compelling and important as these facts are, I want to remind us of the beautiful features of this amazing planet--and that is the coral reef. No doubt, I bring in this marine habitat since I spent the last four months last summer living by the ocean. I swim regularly off the coast of northeastern Nova Scotia, where there is cold water coral. I have seen some of that coral, but this photo shows tropical coral. I am sure we have all seen many of these photos before, but I want to show an example of the variety and beauty of these coral reefs. In taking in this beauty, I invite us to think about the ways in which we human beings have acted that has compromised the ecological integrity of these very important ecosystems. With good reason, coral reefs have

often been called marine nurseries for the roles they play in sustaining many countless marine organisms.

Image by Agnieszka, AliceKeyStudio, courtesy of Pixabay under free use content license, https://pixabay.com/photos/coral-anemone-coral-reef-aquarium-1053837/

Climate Anxiety

Charlie Brown is a great character to invoke about anxiety.
This tiny cartoon shows the compounding effects of the anxiety that either we experience or that our students are experiencing about climate change.



Source: https://www.susangabriel.com/to-inspire/72-things-anxious-times/

On a recent visit to some of the children in my family, I was watching PBS *Cyberchase* with the eight-year-old twins. We watched an episode called *Coral Grief* that showed what some of the degraded coral reefs looked like. I found the information accurate and well presented. I asked the children afterwards what they thought about the program and how they felt about it. They thought it was very instructive. Moreover, they did not seem to be overwhelmed by what they saw. In addition, the characters on the show offered some solutions. This was an important experience for me to have with these 8-year-old children. I thought it was very powerful that PBS is using its platform to bring this to the awareness of the youngsters.

This is what a degraded coral reef looks like.

Source: Kadir van Lohuizen / NOOR, CC License Attribution-NonCommercial-ShareAlike 2.0. https://www.flickr.com/photos/unep/28178906872

Currently there is a decade long effort that the UN Program on the environment has created for ecosystem restoration, with a special focus on coral reefs around the world. These processes are both scientifically challenging and very labor intensive. The program entails replanting coral in areas that have already been degraded and engaging in long term monitoring plans. Adaptive management is a key long- term strategy in these programs in coral reef restoration.

The German word for anxiety is *angst*. When one pronounces the word, it sticks in the throat. It is hard to get out, just as it is hard to dispel anxiety itself. I am taking my lead from the 19th century Danish philosopher Soren Kierkegaard and his understanding of *angst*. Kierkegaard suggests that *angst* is a very appropriate response to embracing the mystery and difficulties of our freedom in the contemporary world. In embracing human freedom in a challenging world,

Kierkegaard stresses the value of inwardness. By inwardness, he does not mean solipsism, but an authentic and uncompromising cultivation of our deepest selves. Inwardness: paying attention to our inner lives (thoughts, emotions, spiritual and physical states). Are we feeling overwhelmed? Use the energy of our anxieties to help address the climate challenges we are facing.

For this paper, I am bracketing all the clinical analyses and definitions of anxiety, as found in the *DSM* (*Diagnostic Statistical Manual of Mental Disorders*). =

The Creative Uses of our Climate Anxiety

The leading question is this: how can we transform the deep anxiety we feel about the climate into productive and positive energy? Feeling overwhelmed? How might we use the energy of our anxieties to help address the issues we face? This practice includes doing this work individually, collectively, and with our students. The strategies I suggest are threefold: awareness, acknowledgement, and actions.

Here is context for what follows.

When I teach my course on environmental philosophy, I always do a segment on climate anxiety. I have done this in the last number of years, because I realize that our students have been living with this in ways that we never did when we were younger. Because of their situation, I want to give them some space within which they can process some of what they have learned and how they feel about it. Moreover, I think it is important that that I talk about my situation first. That way I do not put them on the spot to talk first. In doing so, I avoid starting with what do you students think about climate, are you anxious about it and what does that mean for you? Rather, I talk about my own situation to open the space for them to feel comfortable enough if they want to, to talk about how they feel in class. In these discussions with my students, they tell me the climate crisis has been normalized for them because they do not know anything different. Nevertheless, they are still bereft and anxious. They know that their generation will confront climate change in much more powerful ways than we ever have or will.

So, what do we do about their feelings of being overwhelmed and bereft? First, what I try to do in my course is give students good solid information, not just on climate, but on all the things we talk about during the semester. I want them to discover and appreciate the ways in which they have some agency in dealing with these issues. Even in feeling anxious and overwhelmed, I encourage them to be aware of a whole range of feelings as we discuss climate change. Also, help them be aware that anxiety may lead to avoidance and the prospect of giving up. I try to be attuned to the kinds of comments that students make in order to help them unpack a range of responses and feelings they may be experiencing. I do not try to convince them to change their feelings. I simply want to give them space to acknowledge how they are feeling and what they may be doing about this.

Moreover, I do not limit these approaches to our classes. I give talks for groups and organizations in the community, for example, church groups, nature organizations, and other community groups. In all these settings, attentive listening and active listening are very important. In doing so, I try to create space for people to speak about what they really think and to talk about how they feel. It is important to try to understand what they are saying and to listen with compassion. Avoiding judgment is crucial for open and honest discussions.
The most difficult situation would be one I have hardly encountered, and that would be the compete denial of climate change.

In most settings, with students and community groups, people know something about it. They have varying levels of understanding, but are aware of the basics of the climate situation we are facing. On the feeling level, they identify and talk about feeling anxious and overwhelmed. So again, giving people space in which they can talk about those I think is very important.

Awareness

We need to seek out accurate and comprehensive information about the climate situation, both locally and globally. The best overall and comprehensive information on climate is contained in the periodic reports of the IPCC—the Intergovernmental Panel on Climate Change. The World Meteorological Organization and the United Nations Environment Program established the IPCC in 1988. The members of this panel do not conduct the climate research, but review and organize thousands of scientific studies and publications on a regular basis. The group issues periodic reports for policy makers and the public. The most recent reports called *The Sixth Assessment Report* and *The Synthesis Report* were released on March 20, 2023. Many other groups and organizations work on climate issues around the world and work to give the public accurate scientific information about our climate situation and the challenges we face.

Acknowledgement

Awareness alone is not enough; it has to take the next step of acknowledgement. The climate situation we face is daunting and serious and the challenge is to take it on in a positive way. This does not mean glossing over the immense difficulties we are facing, but realizing that we have many tools at our disposal to meet these challenges—technical, policy, organizational, communal, and individual. We also need to acknowledge and deal with the enormous intellectual, moral, emotional, and spiritual dimensions of doing climate work. We cannot do this alone, but here is also a great deal we can do as individuals and family members. As we care for the planet, we also need to take care of ourselves.

Actions

And then the third part of that, taking actions in order to be able to do something about it now. Some people (I am not one of them) argue that individual actions do not matter and do not count in the grand scheme of things. Some eco-philosophers call this view the illusion of negligibility. They argue that individual actions do matter and that dismissing these actions encourages hopelessness and despair. I often give talks to community groups and when I am asked what

actions people could undertake right now, I answer, “Stop eating meat, especially beef”. Eliminating meat helps reduce the amounts of methane gas going into the atmosphere. As it accumulates in the atmosphere, methane gas is a much more destructive than CO2.

Specific strategies

- Listen to others with understanding and compassion, not judgment.
- Work with others to address climate injustices in all their forms in our own regions and beyond.
- Identify resources that help mitigate climate anxieties.
- Collaborate with others to work on solutions (in person and online).
- Develop climate communication strategies across various platforms. Work out action plans for immediate actions and for the long game.
- Take comfort and pleasure in the tasks at hand and with the people with whom you work.

There is much happening on the local level that the mainstream media does not cover. It fails to cover climate groups, organizations, initiatives, book clubs—a whole range of things that I can point to both here in South Orange and Maplewood and where I live in the summer in Nova Scotia. Here is a question that students and members of community groups ask me on a regular basis, “Dr. Stark, how much time do we have to make the big systemic changes that we need to do in order to mitigate the worst effects of climate change?” I always give two answers. The first answer is “Right now”. That is simply because right now is the only time we really have. When I first developed the course in Environmental Ethics in the mid-1990s, I gave this as my second answer, “Ten to fifteen years.”

Today my first answer is yesterday. Now, the scientific view is that we have perhaps five to seven years to make the big systemic changes that we are going to need to make in order to address serious climate issues.

In my list of Specific Strategies, it may have struck readers odd that I would emphasize taking comfort and pleasure in the work we are doing and in the people with whom we are working. I believe that the elements of pleasure and joy, as extraordinary as they might seem, are very important for doing this work for the long haul.

This is why we are doing this challenging and difficult work--for this gorgeous, beautiful planet. In 1972 when this marvelous picture was taken of the Blue Planet, it was the first time that we, as a species of human beings, saw ourselves from outer space. This photo is a powerful expression of the beauty of this amazing earthly home. This photo also provides us with a kind of intellectual distance. We are given the space we need to be able to do the work we are being called to do. Can we acknowledge the beauty and the necessity of caring for the planet? This is the work that we all need to do in order to save not only ourselves, but also all ecosystems on this planet.

Image courtesy NASA Johnson Space Center [Gateway to Astronaut Photography of Earth https://eoimages.gsfc.nasa.gov/images/imagerecords/55000/55418/AS17-148-22727x294x196.jpg](https://eoimages.gsfc.nasa.gov/images/imagerecords/55000/55418/AS17-148-22727x294x196.jpg)

Here are two final photos from the Climate Strike of 2019 of multigenerational activism (in lower Manhattan):

© Judith Chelius Stark, 2019

The next photo is of a toddler in the stroller. The sign reads, “Your mistakes, my future.”

© Judith Chelius Stark, 2019

This is a powerful reminder of what we did and failed to do that have brought us to this moment in 2024. What actions will we now take to repair the damage we have caused and to ameliorate future environments for the next generations of all living beings?

Indeed, we live in an age of anxiety, but it is up to us to decide how to deal with our climate anxiety. Will we be overwhelmed by it, or will we use its energies to care for ourselves, our communities, and this glorious planet earth?

Bibliography and Suggested Readings

American Psychiatric Association, and American Psychiatric Association DSM-5 Task Force. 2013. *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*. 5th ed. Arlington, VA and Washington, D.C.

Figueres, Christiana, and Tom Rivett-Carnac. 2020. *The Future We Choose: Surviving the Climate Crisis.* New York: Alfred A. Knopf.

Hawken, Paul (ed.). 2017. *Drawdown: the Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. New York: Penguin Books.

The Intergovernmental Panel on Climate Change, https://www.ipcc.ch/

Johnson, Ayana Elizabeth and Katharine K. Wilkinson (eds.). 2020. *All We Can Save: Truth, Courage, and Solutions for the Climate Crisis*. New York: Random House.

Kolbert, Elizabeth. 2006. *Field Notes from a Catastrophe: Man, Nature, and Climate Change*. New York: Bloomsbury.

Pope Francis. 2015. "*Laudato Si'*: On Care for Our Common Home." Encyclical Letter. https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

Pope Francis. 2023. "*Laudate Deum*: To All People of Good Will on the Climate Crisis." Apostolic Exhortation. https://www.vatican.va/content/francesco/en/apost_exhortations/documents/20231004-laudate-deum.html

Ray, Sarah Jacquette. 2020. *A Field Guide to Climate Anxiety: How to Keep your Cool on a Warming Planet.* University of California Press.

CONCLUDING REMARKS

Seton Hall University Faculty Seminar on Climate Change

Lisa Rose-Wiles, PhD., MLIS. Professor, University Libraries, and
Jacob Weger, Lecturer, Environmental Studies & Department of
Sociology, Anthropology & Criminal Justice.

Our goal in organizing this seminar was to offer multidisciplinary perspectives on the challenges of climate change, with a particular focus on the role of the Catholic Intellectual Tradition. We also wanted to stimulate truly multidisciplinary discussions. We believe we succeeded in both endeavors. We are grateful to our seven wonderful presenters and our many attendees, especially our students, all of whom took time out from their busy schedules to participate.

To briefly recap: the seminar was held through Teams over three sessions, each followed by questions and answers.

Session 1 (Thursday, October 26) – 37 attended plus our presenters.

We began with an introduction from Jacob Weger, followed by an opening prayer and presentation "*Catholicism and Care for Creation*" by the Rev. Joseph Laracy, which foregrounded the Catholic Intellectual Tradition, our human duty as stewards of the Earth, and our interconnectedness with all of nature. Fr. Laracy reminded us of Pope Francis's call for "swift and unified global action to care for God's creation" in his 2015 encyclical *Laudato Si*, which was a focal point in several subsequent presentations.

The next presentation, "*Regenerating Ecosystems to Cool the Earth and Restore a Livable Climate*" by Marian Glen answered the call to "Care for Creation" with specific projects that have helped to recover ecosystems. Dr. Glenn showed us several "mini forest" projects, including a local one in Summit that includes an indigenous medicine garden, a project spearheaded by Christina Perez, then a senior at SHU. Inspired in part by this presentation, several students in this semester's Environmental Studies senior capstone class are currently researching the "tiny forest" initiative, with assistance from Dr. Glenn and Ms. Perez.

Session 2: (Friday, November 3). 14 attended.

Jared Best's presentation "*Climate Change and Eco-Social Work*" framed climate change as a social justice issue, resonating with the themes of human dignity and options for the poor and vulnerable found in Catholic social teaching. Using the example of "Asthma Alley" in the Bronx, Dr. Best explained how social workers use "Ecological systems theory" to improve the fit between a person and their environment by working with individuals and confronting systemic and structural issues such as environmental racism.

Thomas Rzeznik gave us "*Laudato Si' and Catholic Social Teaching: Historical Roots, Contemporary Growth*", showing how Francis constructively applies older themes and principles to the modern ecological crisis. Dr. Rzeznik reflects on Pope Francis's message that "we cannot address climate change as individuals or even as individual nation-states. We need to come together, walk together, act together" and provocatively asks "How can we model this in our own work as faculty and as a university community?".

Michael Taylor's presentation "*Climate Change, Zoonotic Disease, and Antimicrobial Resistance: Addressing Wicked Global Health Problems with the One Health approach",* emphasizing the need for a holistic approach to these interconnected problems, and explaining the CDC's One Health efforts to design and implement research, education, and public policies to achieve better public health outcomes.

Note: this session was notable for the participation of Susan Haig, founder and director of our local "Civic Story"

Session 3. Thursday, November 11. (36 attended)

Heinrik Hellwig began the seminar with *"The Lynn White Thesis and the Wicked Problem of Climate Legislation"*, exploring how anthropocentrism (human focused) and ecocentrism (nature focused) approaches might both be represented in climate change legislation. Lynn White was a historian who came to believe that the fundamental issue with climate change is "people's beliefs and attitudes about the proper relationship to nature", and that the solution to environmental problems must be religious – bringing us back to our focus on the Catholic Intellectual Tradition.

Judith Stark returned the focus to our students with her presentation "*Climate anxiety: the Perils and the Prospects",* focusing on "creative uses of climate anxiety" – rather than becoming overwhelmed and feeling hopeless. She stressed the need to give students space to acknowledge and talk about climate anxiety, recognize the intersectionality of the many factors involved, and to work with others to address climate injustices in our area. Her practical suggestions dovetailed beautifully with Marian Glen's presentation and the recurring theme of how to practically "Care for Creation" that Fr. Laracy introduced.

Overall, we were delighted with the seminar. It was a wonderful opportunity to bring faculty from different disciplines together and to incorporate perspectives from the Catholic Intellectual Tradition. The contemporary relevance of the CIT, especially Pope Francis's *Laudito Si*, was strikingly evident throughout. Even when it was not specifically referenced, key aspects such as our responsibility as Earth's stewards, social justice, consideration for the poor and marginalized, and the need for individual and cooperative action permeated the presentations. We were also delighted by the excellent attendance, especially at such a busy time, and the participation of so many students. The proceedings do not do justice to the questions and lively discussions that followed each session, but we hope that they give a sense of what we accomplished.

Let's do it again!

APPENDIX: INITIAL SHARED BIBLIOGRAPHY for
FACULTY SEMINAR ON CLIMATE CHANGE,

Catholic Church, and Sean McDonagh. 2016. *On Care for Our Common Home : The Encyclical of Pope Francis on the Environment, Laudato Si'*. Maryknoll, New York: Orbis Books.

Demeritt, David. 2001. "The Construction of Global Warming and the Politics of Science." *Annals of the Association of American Geographers*, *91*(2), 307–337.

DiLeo, Daniel R. 2020. "Introduction: The 'Climate Emergency' and US Catholic Responses to *Laudato Si'*." *Journal of Moral Theology* 9: 1–18. (this is an entire issue on the Catholic response to climate change).

Dunlap, Julie, and Susan Cohen, eds. 2016. *Coming of Age at the End of Nature: A Generation Faces Living on a Changed Planet*. San Antonio: Trinity University Press.

Ghosh, Amitav. 2016. *The Great Derangement : Climate Change and the Unthinkable*. Chicago: The University of Chicago Press.

Hulme, Mike. 2009. *Why We Disagree About Climate Change: Understanding, Opportunity, Inaction, and Controversy*. Cambridge, UK: Cambridge University Press.

Miller, Richard W. 2020. "Climate Change, Catholic Social Teaching, and Human Rights." *Interdisciplinary Journal for Religion and Transformation in Contemporary Society* 6 (1): 171–92. doi:10.30965/23642807-00601011.

Moellendorf, Darrel. 2022. *Mobilizing Hope: Climate Change and Global Poverty*. New York, NY: Oxford University Press.

Ormerod, Neil. 2021. "The Law of the Cross and Climate Change." *Theological Studies* 82 (2): 238–58. doi:10.1177/00405639211009947.

Schaefer, Jame. 2011. *Confronting the Climate Crisis: Catholic Theological Perspectives*. Milwaukee, Wis.: Marquette University Press.

Shulski, Martha, and Daniel R DiLeo. 2020. "What is Happening to our Common Home?: Considerations from a Catholic Climate Scientist and a Catholic Theological Ethicist." *Journal of Moral Theology* 9: 71–89.

Swyngedouw, Erik. 2010. "Apocalypse Forever?: Post-Political Populism and the Spectre of Climate Change." *Theory, Culture and Society* 27 (2): 213-232–232. doi:10.1177/0263276409358728.

Wilkins, Dominic. 2022. Catholic clerical responses to climate change and Pope Francis's Laudato Si'. *Environment and Planning E: Nature and Space*, *5*(1), 146-168–168. https://doi.org/10.1177/2514848620974029

Williams, David T. 1993. "'Fill the Earth and Subdue It' (Gn 1:28): Dominion to Exploit and Pollute?" *Scriptura* 44 (March): 51–65.