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## What is Happening to Our Common Home: Reflections from One Catholic Scientist and One Theological Ethicist

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## What is Happening to Our Common Home? Considerations from a Catholic Climate Scientist and a Catholic Theological Ethicist

Martha D. Shulski and Daniel R. DiLeo<sup>1</sup>

**A**LTHOUGH I HAVE LIVED in several different places across the country, I am a Nebraskan by birth and by choice. My father graduated from Creighton way back in 1956. Growing up on a farm in southeast Nebraska, he had a passion for weather, as most people in the Plains do. I “inherited” his passion and went on to become a meteorologist. When I was in graduate school, I took courses in applied sciences and studied how the weather and climate impact people, our health, ecosystems, where and how we grow food. This was fascinating to me and became my professional goal, to serve as an applied climatologist—someone who studies the interaction of climate and our environment, our common home, and works with people to find solutions. Unfortunately, my dad passed five years ago, before I became the State Climatologist of Nebraska. But I would like to think he is looking at all of us now and smiling at why we are gathered here.

You might be asking yourself, “Nebraska has a state climate office?” Yes! Nebraska is one of forty-seven members in the American Association of State Climatologists.<sup>2</sup> We exist to track Nebraska’s ever-changing weather conditions through our state weather network and have collected observations long enough to have our own local climate record. From this record, we know that temperatures have risen and springs are increasingly wetter. Our office also exists to help people decipher complicated climate model projections, answering the question, “How will climate change impact me and what can I do about it?” We contributed to the publication of *Understanding and*

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<sup>1</sup> This article is a collaborative effort of its two authors. The opening section is written from the perspective of Dr. Shulski, who delivered the original text as a conference plenary address. The subsequent sections are written from the perspective of Dr. Shulski and Dr. DiLeo, who together move from the former’s experience to broader considerations of what is happening to our common home.

<sup>2</sup> American Association of State Climatologists, “State Programs,” 2019, [www.state-climate.org/state\\_programs](http://www.state-climate.org/state_programs).

*Assessing Climate Change: Implications for Nebraska*<sup>3</sup> in 2014 and localized the *Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States*.<sup>4</sup> Through this work, we serve farmers and ranchers, natural resource managers, public power utilities, cities, Rotarians, business leaders, the media, state agencies, insurance firms, law offices, youth, retirees, researchers, and faith communities. In short, our job is to compile, synthesize, and translate complex climate data so it can be used for decision-making in a meaningful way. We help people look at climate scenarios and manage their risk to our state's variable and changing climate. In terms of *Laudato Si'*, we provide and interpret scientific data with which persons can adequately "enter into dialogue with all people about our common home" (no. 3).

Acting on climate change (from local to global levels, personal choices to policy implementation) requires and will require human behavior change. In my opinion, we must connect with people so that they care about this crisis, tell them a story, and provide tangible solutions so that meaningful action can be taken. Changing climate is now an existential threat. It is one of the most challenging issues of our time. At this point, we need action soon to mitigate future impacts of climate change. The longer we wait, the riskier it is. Think about it this way: several world-renowned medical doctors have told you that one of your children has been diagnosed with a serious and life-changing illness, that she needs treatment urgently to preserve her quality of life. Would you say you do not believe them and that you are going to wait and see how things play out and hope that she will adapt? That would in no way be a risk that I am willing to take. I would take the advice of the trained scientists and do what I could to preserve life. To me, that choice would constitute prudence—a cardinal moral virtue that the Catholic Church has made a fulcrum of its climate change teaching and to which I will return. For the sake of prudence, this essay makes several key points about climate change: It is real; it is here and all around us; human activities are responsible for it; the scientific community agrees with these facts; it can be considered in terms of evil, goodness, rightness, and cooperation; there are tactics and resources with which humans can hopefully mitigate this pending catastrophe.

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<sup>3</sup> University of Nebraska–Lincoln, *Understanding and Assessing Climate Change: Implications for Nebraska* (Lincoln: University of Nebraska–Lincoln, 2014), [snr.unl.edu/download/research/projects/climateimpacts/2014ClimateChange.pdf](http://snr.unl.edu/download/research/projects/climateimpacts/2014ClimateChange.pdf).

<sup>4</sup> Martha Shulski, "Nebraska's Changing Climate—Highlights from the 4th National Climate Assessment," University of Nebraska–Lincoln, December 6, 2018, [www.cropwatch.unl.edu/2018/nebraska-changing-climate](http://www.cropwatch.unl.edu/2018/nebraska-changing-climate).

Before treating each item, it is worth noting several key points about our climate. First, weather is different from climate. As the National Aeronautics and Space Administration describes, “The difference between weather and climate is a measure of time. Weather is what conditions of the atmosphere are over a short period of time, and climate is how the atmosphere ‘behaves’ over relatively long periods of time.”<sup>5</sup> In other words, weather is your mood and climate is your personality. While your mood can change from day to day, your personality reflects your demeanor and what your extremes are. Or put in terms of theological ethics, weather is analogous to discrete moral action, while climate is comparable to character-based virtue. Just as one instance of warm weather does not necessarily indicate a warm climate, so too a person who carries out one just act is not necessarily animated by the virtue, i.e., dispositional habit, of justice. At the same time, instances of repeatedly warm weather suggest a warm (or warming) climate just as someone who consistently acts justly is more likely moved by the virtue of justice.

Another important point is that our common home’s climate is a system. It is composed of our diverse landscape, the vast ocean that is key for heat storage and transport, our fast moving and dynamic atmosphere, and our natural air conditioner—the frozen world of ice and snow. There are complex interactions that take place among and between these four components of our climate system. Scientists have become remarkably good at using math, physics, and chemistry to model our natural world, and these models are consistently improving over time. This modular improvement is important because over time, and increasingly in recent decades, humans have altered Earth’s ecosystems and put quite a fingerprint on our common home. In a sense, this is not surprising—as Pope Francis observes in *Laudato Si’*, humans “are part of nature, included in it and thus in constant interaction with it” (no. 139). We are now at the point, however, where scientists are discussing the dawning of a new era to describe human’s unprecedented influence on Earth, termed the *anthropocene*. As but one example of how this concept is being used, the Vatican’s Pontifical Academy of Sciences published a report in 2011 titled *Fate of Mountain Glaciers in the Anthropocene*.<sup>6</sup>

The further point worth noting is that climate varies and changes in part because of natural causes. At very long time scales (tens to hundreds of thousands of years), the energy we receive from the sun

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<sup>5</sup> National Aeronautics and Space Administration, “What’s the Difference Between Weather and Climate?” [www.nasa.gov/mission\\_pages/noaa-n/climate/climate\\_weather.html](http://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html).

<sup>6</sup> Pontifical Academy of Sciences, *Fate of Mountain Glaciers in the Anthropocene: A Report by the Working Group Commissioned by the Pontifical Academy of Science* (Vatican: Pontifical Academy of Sciences, 2011), [www.casinapiov.va/content/dam/accademia/pdf/glaciers.pdf](http://www.casinapiov.va/content/dam/accademia/pdf/glaciers.pdf).

is altered enough to change our climate. This happens through changes in the earth's orbit and is termed Milankovitch cycles. If you have not heard of that term, you have probably heard of ice ages. These cycles determine the cold glacial and warm interglacial time periods. On a much shorter timescale, there is variability of energy output from the sun, which impacts the temperature of our common home. Volcanic activity also influences our climate. As particles are ejected into the atmosphere, it can reduce solar energy and cool temperatures on earth, temporarily. And finally, the climate varies naturally through what are called teleconnection patterns. Variability in circulation of the ocean and atmosphere for portions of the globe have global implications. You have probably heard of at least one of these—El Niño, which means the Christ Child.

### **CLIMATE CHANGE IS REAL AND IT IS HERE**

We know from many types of data sources that monitor the weather and climate conditions that the earth, our common home, has warmed. It now has a fever, which, if left unchecked, will approach dangerous levels with dire consequences that implicate core faith commitments of the Catholic tradition. Unfortunately, it seems that many US Catholics—and many American more broadly—do not adequately grasp the urgency and severity of what Pope Francis has appropriately called a “climate emergency.”<sup>7</sup>

We have been tracking the temperature of earth in a systematic way for over a century, and in some places even longer than this. We see that variability on an interannual and decadal scale—due to natural factors. But do not be fooled by the ups and downs. It is the long-term trend that describes climate change. Here in Nebraska, we live in a highly continental climate where the variability from year to year is very strong. Our assessment of climate trends indicates that we have warmed 1.5°F in the last 120 years on an annual average. This rate of warming has increased in recent decades. Nights have warmed twice as much as days. When and how we receive precipitation has shifted and our years are getting wetter over time.

We also see that climate does not change uniformly. Certain areas of the globe have warmed much more than others, and this is to be expected because of regional differences. The Arctic is warming at least twice as fast as the rest of the world. Why? Changes are amplified here because these areas are losing snow and ice that reflect solar energy. As a result, darker surfaces that absorb more energy are being

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<sup>7</sup> Pope Francis, “Address to Participants at the Meeting Promoting by the Dicastery for Promoting Integral Human Development on the Theme: The Energy Transition & Care of Our Common Home,” Vatican, June 14, 2019, [www.vatican.va/content/francesco/en/speeches/2019/june/documents/papa-francesco\\_20190614\\_compagnie-petrolifere.html](http://www.vatican.va/content/francesco/en/speeches/2019/june/documents/papa-francesco_20190614_compagnie-petrolifere.html).

exposed and causing the Arctic to warm much faster than any other part of our common home. There is a saying I have heard from those in the Arctic: “climate changed.”

We can look beyond the weather records at other planetary markers and observe the same warming. The two main causes for sea level rise are land ice melt and thermal expansion of the ocean. Amidst the climate crisis, global sea level has risen nearly 250 millimeters since 1880 and is on the rise at a rate of 3.3 millimeters per year.<sup>8</sup> This puts communities around the globe at serious risk: nearly forty percent of the US population lives in shoreline counties, while forty percent of the global population lives within 100 kilometers of a coastline.<sup>9</sup> This sea-level rise, along with resource stress and conflict, is one of the reasons Christian Aid has warned that the world could experience one billion so-called “climate refugees” by 2050.<sup>10</sup> It is also why researchers at Cornell University suggest the world could have two billion climate refugees by 2100.<sup>11</sup>

Here in the US, some areas even experience what is called nuisance flooding as the sea makes its way into coastal cities even on a sunny day. Aquatic and terrestrial species are shifting, and pests and disease are moving into new areas. What we can plant and grow now is different than decades ago, snow at higher elevations is less, glaciers are melting, and permafrost is thawing. These changes describe what has happened in the modern era, but in a proximal way we can observe our climate history through the camera lens of ice cores, lake sediments, tree rings, and other methods. In doing so, what it tells us is that we are warmer now than what we have been for hundreds of thousands of years. And what is even more striking is that our climate is now changing faster than at any point in modern civilization. This current rate of change, and an acceleration of this rate of change, is very concerning. P

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<sup>8</sup> National Aeronautics and Space Administration, “Sea Level,” July 31, 2019, [climate.nasa.gov/vital-signs/sea-level/](https://climate.nasa.gov/vital-signs/sea-level/).

<sup>9</sup> National Oceanic and Atmospheric Administration, “What Percentage of the American Population Lives Near the Coast?” 2018, [www.oceanservice.noaa.gov/facts/population.html](https://www.oceanservice.noaa.gov/facts/population.html); United Nations, “The Ocean Conference - Factsheet: People and Oceans,” 2017, [www.un.org/sustainabledevelopment/wp-content/uploads/2017/05/Ocean-fact-sheet-package.pdf](https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/05/Ocean-fact-sheet-package.pdf).

<sup>10</sup> Christian Aid, *Human Tide: The Real Migration Crisis* (London: Christian Aid, 2007).

<sup>11</sup> Charles Geisler and Ben Currens, “Impediments to Inland Resettlement Under Conditions of Accelerated Sea Level Rise,” *Land Use Policy* 66 (2017): 322-330.

## CLIMATE CHANGE IS DRIVEN BY HUMAN ACTIVITIES—AND SCIENTISTS AGREE

For several reasons, the explanation of observed climate change has become a “debated” political issue. This is *not* the case for physical scientists. We spend our careers studying how much the climate is changing, how it varies regionally, what is causing the change, and how can we improve the models that give us projections.

Climatologists understand that climate changes due to natural causes (e.g., volcanic eruptions in the short term and earth’s orbital changes in the long term), as well as anthropogenic, or human, causes. In particular, we have known since the 1800s that carbon dioxide and other gasses absorb energy emitted by earth and reemit it back to us, keeping us warm and habitable in what is called the greenhouse effect.<sup>12</sup> We would in fact be 60 degrees colder on average were it not for this effect. In this regard, the natural greenhouse effect is colloquially good, i.e., desirable, for humans and present non-human creation since it has allowed life to evolve as we know it.

Unfortunately, we also know that human activities since the Industrial Revolution have elevated atmospheric concentrations of greenhouse gases (GHGs). Carbon dioxide is currently at a level we have not experienced in human history: more than 400 parts per million (ppm).<sup>13</sup> Similarly, atmospheric concentrations of methane and nitrous oxide—two GHGs with more heat-trapping potency than carbon dioxide—are also at historically unparalleled levels.<sup>14</sup>

As mentioned, we can mathematically model our climate system. When we start these models at 1900 and recreate our climate, they can only do so accurately when we consider both natural and anthropogenic forcing. Only when we factor in the human component—land use change and GHGs—do we correctly simulate what is happening to our common home.<sup>15</sup> Put differently, observed climate change cannot be adequately explained by factors *other than* human activities that emit—pollute—greenhouse gases.

Based on the scientific evidence and verifiable data, the National Aeronautics and Space Administration (NASA) can point out how “multiple studies published in peer-reviewed scientific journals show

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<sup>12</sup> National Aeronautics and Space Administration, “The Causes of Climate Change,” July 31, 2019, [www.climate.nasa.gov/causes/](http://www.climate.nasa.gov/causes/).

<sup>13</sup> Brian Kahn, “Earth’s CO<sub>2</sub> Passes the 400 PPM Threshold—Maybe Permanently,” *Scientific American*, September 27, 2016, [www.scientificamerican.com/article/earth-s-co2-passes-the-400-ppm-threshold-maybe-permanently/](http://www.scientificamerican.com/article/earth-s-co2-passes-the-400-ppm-threshold-maybe-permanently/).

<sup>14</sup> Intergovernmental Panel on Climate Change, *Climate Change 2014: Synthesis Report— Summary for Policymakers* (Geneva: Intergovernmental Panel on Climate Change, 2014).

<sup>15</sup> Union of Concerned Scientists, “How Do We Know that Humans Are the Major Cause of Global Warming?” [www.ucsusa.org/global-warming/science-and-impacts/science/human-contribution-to-gw-faq.html](http://www.ucsusa.org/global-warming/science-and-impacts/science/human-contribution-to-gw-faq.html).

that 97 percent or more of actively publishing climate scientists agree: Climate-warming trends over the past century are extremely likely due to human activities.”<sup>16</sup> Similarly, NASA points out that most illustrious scientific bodies in the US and around the world—including the US National Academy of Sciences, American Meteorological Society, and the Nobel Prize-winning Intergovernmental Panel on Climate Change—affirm that human activities are predominately responsible for observed global warming. The significance of such agreement levels within the scientific community cannot be overstated. Scientists are inherently doubtful creatures who are taught to question everything—including our own research findings as well as others’ results. To these ends, rigorous physical scientists have anonymous peers review scientific results for soundness and provide critical recommendations about whether a submitted finding is fit for publication. Yet out of this extraordinarily rigorous process, scientists agree and the science is incontrovertibly settled: humans are primarily responsible for observed global warming that threatens our common home.

### **EVIL, GOODNESS, RIGHTNESS, AND COOPERATION<sup>17</sup>**

In addition to speaking about climate change in scientific terms, we can also discuss the topic from the perspective of morality. To this end, it is important to clarify some key terms. Good in the Thomistic tradition refers to perfection (ST I, q. 5, a. 1) or “full actualization of any being’s potential.”<sup>18</sup> Conversely, evil refers to “the absence of the good, which is natural and due to a thing” (ST I, q. 49, a. 1)—in other words, “lack of perfection in anything whatsoever” in terms of how it ought to be.<sup>19</sup> Building on this distinction, Peter Knauer and other Catholic theologians distinguish between two types of evil that can advance moral reflection about climate change.<sup>20</sup>

Physical evil is corporeal imperfection that occurs in the world either through natural processes (e.g., an earthquake) or as unintended consequences from the pursuit of good (e.g., pain inflicted by a surgeon trying to heal a patient). Thus understood, moral evil entails im-

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<sup>16</sup> National Aeronautics and Space Administration, “Scientific Consensus: Earth’s Climate is Warming,” July 31, 2019, [www.climate.nasa.gov/scientific-consensus/](http://www.climate.nasa.gov/scientific-consensus/).

<sup>17</sup> Although this section contains our own analyses, we are grateful to the following scholars who provided helpful input and feedback to earlier drafts: James T.

Bretzke, SJ, PhD, professor of theology at John Carroll University; Ronald P. Hamel, PhD, retired senior director of ethics at the Catholic Health Association of the United States; and James F. Keenan, SJ, Canisius Professor of theology at Boston College.

<sup>18</sup> Richard M. Gula, *Reason Informed by Faith: Foundations of Catholic Morality* (Mahwah, NJ: Paulist Press, 1989), 43.

<sup>19</sup> Gula, *Reason Informed by Faith*, 269.

<sup>20</sup> Peter Knauer, “The Hermeneutic Function of the Principle of Double Effect,” *The American Journal of Jurisprudence* 12, no. 1 (1967): 132-162.

perfection produced by free and knowing acts of commission or omission that intend or, in violation of the principle of double effect, unreasonably allow physical evil that is disproportionate relative to a pursued value.<sup>21</sup> As Cathleen Kaveny describes, moral evil can also exist when a person freely and knowingly cooperates in the moral evil of another in one of two ways. The first is formally, wherein one intends to advance the moral evil of another “either as an end in itself or as a means to some other end.”<sup>22</sup> The second is materially, wherein a person “foresees but does not intend that his or her action will facilitate the wrongful action of the primary agent” and lacks sufficient justification for cooperation in one of several areas (e.g., inevitability and gravity of the primary evil, frequency, potential for scandal, and proximity to the wrong—immediate or remote).<sup>23</sup> Finally, and as a sort of synthesis between the concepts of moral evil and cooperation, moral evil might also be described as free and knowing perpetuation of systems and policies as “structures of sin” or “social sins” (*Sollicitudo Rei Socialis*, no. 36) that contribute to physical evils disproportionate to pursued values. In all cases, moral evil constitutes sin as culpable failure on the part of a moral agent to love. Especially in reference to structures of sin, the term “culpable” is important. As Richard Gula emphasizes, “Being responsible for causing social sin does not automatically mean we are morally culpable for it. Culpability demands knowledge and freedom.”<sup>24</sup>

Informed by these concepts, we can think of climate change in relationship to evil in several ways. First, we can describe this reality as physically evil insofar as its geophysical consequences—glacial melt, rising sea levels, species extinction, etc.—disrupt the “ordered system” of God’s creation (*Laudato Si’*, no. 5, quoting *Sollicitudo Rei Socialis*, no. 34), the original perfection of which inspired God to seven times declare creation “good” in Genesis 1. Relatedly, we can designate climate change physically evil vis-à-vis humans to the extent that its humanitarian consequences—population displacement, food and water stresses, disease, and fatalities—constitute “a lack of perfection which impedes the fulfillment of” persons and communities.<sup>25</sup> Relatedly, we can begin to consider climate change in terms of moral evil. Here, however, we must nuance the conversation in several

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<sup>21</sup> Knauer, “The Hermeneutic Function of the Principle of Double Effect,” 133, 136; James Walter, “Proportionate Reason and its Three Levels of Inquiry: Structuring the Ongoing Debate,” *Louvain Studies* 10 (Spring 1984): 32.

<sup>22</sup> Cathleen Kaveny, *Law’s Virtues: Fostering Autonomy and Solidarity in American Society* (Washington, DC: Georgetown University Press, 2012), 247.

<sup>23</sup> Kaveny, *Law’s Virtues*, 248.

<sup>24</sup> Gula, *Reason Informed by Faith*, 120.

<sup>25</sup> Louis Janssens, “Ontic and Moral Evil” in *Readings in Moral Theology, No. 1: Moral Norms and Catholic Tradition*, eds. Charles E. Curran and Richard A. McCormick (New York: Paulist Press, 1979), 67.

ways. First, few if any people likely intend through their actions to produce disproportionate physical evils—geophysical or humanitarian—associated with climate change. Next, there is dispersion regarding the causes and consequences of climate change. No one person or structure causes this overarching phenomenon, no single individual or corporate action causes the consequent physical evils, and no one physical evil is due to the actions of a specific person or institution (although larger institutions and those in authority clearly have more capacity to exacerbate the physical evils of climate change). Since assessment of moral evil regarding discrete and cooperating actions requires application of the principle of double effect to demonstrate that a permitted physical evil is disproportionate to the sought value, it can be difficult to evaluate actions as morally evil with respect to climate change. This is especially so for at least two reasons.

First, the freedom necessary to enact moral evil is frequently circumscribed in the context of climate change by fossil fuel-based systems, structures, and policies that often preclude alternative actions.<sup>26</sup> If I want to pursue the value of human dignity<sup>27</sup> by seeking immediate medical attention for a heart attack, for example, existing infrastructure and policies may leave me no choice but to ride in an ambulance fueled by gasoline to a hospital that uses electricity from a coal-fired power plant. Second, the level of knowledge required for a person to commit a moral evil for which she or he is culpable may not be readily available. For example, one may lack either “conceptual,” informational knowledge about how fossil fuel consumption exacerbates climate change or “evaluative,” experiential knowledge about how climate change injures human persons.<sup>28</sup> In terms of Catholic moral theology, one may stand “invincibly ignorant” wherein she or he is objectively responsible for exacerbating or cooperating with the perpetuation of physical evils associated with climate change but not be morally culpable for them (*Catechism*, no. 1793). This might especially occur when a person “strives” to satisfy objective moral standards but fails—in fundamental moral terms, when someone acts in goodness to “attain” rightness but achieves wrongness.<sup>29</sup> In today’s information age in which many people have unprecedented access to conceptual and at least indirect forms of evaluative knowledge through “vicarious experience,”<sup>30</sup> there would appear to be a relatively high burden of

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<sup>26</sup> I am grateful to Ronald A. Simkins, PhD, Professor of Hebrew Bible and Near Eastern Studies at Creighton University, for this insight.

<sup>27</sup> Gula, *Reason Informed by Faith*, 273.

<sup>28</sup> Gula, *Reason Informed by Faith*, 83-87.

<sup>29</sup> James Keenan, *Goodness and Rightness in Thomas Aquinas’s Summa Theologiae* (Washington, DC: Georgetown University Press, 1992), 3, 11. See also Gula, *Reason Informed by Faith*, 273, 283.

<sup>30</sup> International Commission on the Apostolate of Jesuit Education, *Ignatian Pedagogy: A Practical Approach* (Rome: General Curia of the Jesuits, 1993), no. 45.

proof to satisfy claims of invincible ignorance. In cases where the burden of proof is not satisfied and a person acted with sufficient freedom, she would stand in vincible ignorance that she could have mitigated through effort “to find out what is true and good” (*Gaudium et Spes*, no. 16). Depending on the value sought by her action and the freedom with which it was performed, she may thus be morally culpable for discrete or cooperative actions that disproportionately permit physical evils associated with climate change. Thus, while we may be able to speak about climate change in terms of moral evil, we must be cautious given all the variables and uncertainties.

If we cannot always clearly describe climate change in terms of moral evil, one may ask whether such discussion is even fruitful. In our opinion, it worthwhile because it underscores that despite ambiguities all persons may still exercise agency amidst the climate crisis and might be culpable for actions that contribute to our climate emergency. Additionally, discussion of climate change in terms of moral evil reveals that ignorance—whether vincible or invincible—can contribute to the physical evils associated with this emergency. Consideration of climate change as moral evil thus helps underscore Pope Francis’s call in *Laudato Si’* for robust “ecological education” (nos. 209-215) that, among other things: catalyzes “ecological conversion” rooted in authentic encounter with God and God’s creation (nos. 216-221); communicates “scientific information,” promotes solidarity, and includes “critique[s] of the ‘myths’ of a modernity grounded in a utilitarian mindset (individualism, unlimited progress, competition, consumerism, the unregulated market)” (no. 210); “instill[s] good habits” (no. 211) and “cultivate[s] the ‘ecological virtues’” (no. 88); and enables persons “to become painfully aware, to dare to turn what is happening to the world into our own personal suffering and thus to discover what each of us can do about it” (no. 19).

This insight about the need for ecological education is especially important considering the distinction between moral goodness / badness and rightness / wrongness. A morally good person who strives for rightness but executes wrong action or suffers from wrong internal ordering in the face of climate change will need information and schooling in prudence, i.e., the virtue of “right reason applied to action” (ST II-II, q. 47, a. 8), to realize right external action and internal ordering.<sup>31</sup> This person as good is already interested in pursuing the right. Learning from her mistake, she can change her disordered habits and cultivate virtues as “good habit[s]” (ST I-II, q. 55, a. 3). Against this backdrop, it is unsurprising that the US Conference of Catholic Bishops’ (USCCB) statement *Global Climate Change: A Plea for Dialogue, Prudence, and the Common Good* cites this virtue in its title

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<sup>31</sup> Keenan, *Goodness and Rightness in Thomas Aquinas’s Summa Theologiae*, 15-16.

and declares, “The virtue of prudence is paramount in addressing climate change.”<sup>32</sup> Similarly, a morally bad person who does not strive for rightness and does wrong actions or suffers from wrong internal ordering will at minimum require “exhortation ... for the sake of goodness” to become good and live rightly in the face of climate change.<sup>33</sup> This person needs to be converted—to undergo an “ecological conversion” (*Laudato Si'*, nos. 216-220)—or to wake up morally and realize that his disinterest in knowing the right is not tolerable. This person needs a clean heart and needs now to pursue through the will the desire to find the right way of living in a world deeply in need of good people who obtain and enact “ecological education.”

Given the disparate nature of climate change causes and consequences as well as the pervasiveness of fossil fuel-intensive systems, structures, and policies in the contemporary United States, discussion of climate change and moral evil must also be nuanced by revised attention to cooperation with evil. Kaveny emphasizes that the traditional concept of cooperation with evil is valuable. However, she also argues its development in the context of cooperation between individual persons makes it of limited value when considering a person’s cooperation with impersonal structures of sin.<sup>34</sup> This certainly appears to be the case with climate change. As noted, the physical evils associated with this reality are largely produced by systems and structures rather than one “primary agent” with whose moral evil another might culpably cooperate (although again, some institutions and persons in authority are relatively responsible for perpetuating the systems that produce the physical evils of climate change). Additionally, one’s cooperative participation in a structure that generally exacerbates the climate crisis does not neatly contribute to the production of one physical evil—either in total or in specific part. It is not the case that my receiving fossil fuel-based medical treatment causes a specific drought or even some discernable percentage. It would thus be impractical to apply the principle of double effect and discern the precise proportionality of allowed physical evils and sought values in an instance of structural participation. Due to these ambiguities and the abovementioned limitations that systems place on freedom, it is thus difficult to definitively identify moral evil and assign moral culpability for one’s participation in structures of sin like those that drive the climate crisis based solely on the traditional concept of cooperation with evil.

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<sup>32</sup> US Conference of Catholic Bishops, *Global Climate Change: A Plea for Dialogue, Prudence, and the Common Good*, 2001, [www.usccb.org/issues-and-action/human-life-and-dignity/environment/global-climate-change-a-plea-for-dialogue-prudence-and-the-common-good.cfm](http://www.usccb.org/issues-and-action/human-life-and-dignity/environment/global-climate-change-a-plea-for-dialogue-prudence-and-the-common-good.cfm).

<sup>33</sup> Keenan, *Goodness and Rightness in Thomas Aquinas’s Summa Theologiae*, 16.

<sup>34</sup> Kaveny, *Law’s Virtues*, 261-265.

Although the traditional category of cooperation with evil may be limited in its ability to discern individuals' moral culpability for actions related to modern social structures, Kaveny writes, "Does it mean that actions raise no moral problems? Absolutely not. Rather, it means we need to develop new ways of analyzing the involvement of individuals in systemic structures of complicity."<sup>35</sup> To this end, Kaveny argues for greater consideration of three topics.<sup>36</sup> The first is "aggregated agency" and essentially calls persons to discern whether one's needs or the needs of those for whom one is responsible merit participation in a structure of sin. If so, she argues this topic then calls a person to discern whether there are offsetting actions she might take. Within the context of climate change, an example of greater attention to aggregated agency might be discernment of whether one's participation in the fossil fuel-based transportation system by taking a flight or trip in a gasoline-fueled vehicle is relatively necessary. If not, such travel could be viewed as a sort of moral evil. If the trip is merited, greater attention to aggregated agency might call the traveler to discern whether to purchase carbon offsets and if failure to do so might constitute a moral evil.

In addition to "aggregated agency," Kaveny calls for consideration of "currents of action." By this, she refers to how nations, agencies, corporations, and other aggregate entities both react to and shape actions of individuals and organizations. In terms of moral discernment, attention to this category calls persons to address the degree to which their choices—purchasing, investing, transporting, etc.—support or confront the actions of institutions that condition choices and perpetuate social structures for better or worse. In terms of climate change, one possible example of what Kaveny describes is how many individuals and leaders of institutions have divested from fossil fuel corporations. On their analysis, corporations perpetuate a carbon-based economy through "core business"<sup>37</sup> models of profit-driven hydrocarbon extraction, sow confusion about climate science, and lobby against policies to mitigate climate change. Advocates of divestment argue that these corporate actions directly cause greenhouse gas pollution and propagate carbon-based structures. As such, proponents of divestment contend that investment in fossil fuel companies is unethical because it commits financial and tacit support to corporate actions that perpetuate the climate crisis and exacerbate climatically disastrous structures. Relatedly, fossil fuel investment is further deemed unethical because it diverts provision of financial and tacit support away

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<sup>35</sup> Kaveny, *Law's Virtues*, 261.

<sup>36</sup> Kaveny, *Law's Virtues*, 263-265.

<sup>37</sup> Bill McKibben, "Global Warming's Terrifying New Math," *Rolling Stone*, July 19, 2012, [www.rollingstone.com/politics/politics-news/global-warmings-terrifying-new-math-188550/](http://www.rollingstone.com/politics/politics-news/global-warmings-terrifying-new-math-188550/).

from corporate bodies working to mitigate climate change and reform carbon-based structures.

In response, 58,000 individuals and nearly 1,200 institutions—thirty percent faith-based—had divested \$14 trillion in assets from the fossil fuel industry as of March 2020.<sup>38</sup> In doing so, many such persons and groups hope to mitigate the climate crisis by refusing to cooperate with the extractive actions and legislative activities of fossil fuel corporations through provision of financial and tacit support. Many divestors also hope to stigmatize fossil fuel corporations in ways that discourage societal support of their activities<sup>39</sup> and empower lawmakers to reject fossil fuel campaign contributions that may discourage legislation against these companies' interests.<sup>40</sup> Relatedly, many are proactively using divested funds to cooperatively reinvest in companies pursuing truly clean energy and advocating for prudent solutions to the climate emergency. In short, many fossil fuel divestors seem to be embracing and enacting the sort of attention to “currents of action” for which Kaveny calls.

Alongside “aggregated agency” and “currents of action,” Kaveny finally argues that more sufficient moral attention to systemic participation requires balancing prophecy and pilgrimage to facilitate “the inbreaking kingdom of God.” By prophecy she means deep commitment to faith-based values that inspires adamant resistance to cooperation with structures of sin. By pilgrimage she refers to recognition that on Catholics' journey through our imperfect world, cooperation with structural evil is inevitable—and may even be necessary to advance justice. In the context of climate change, a prophet might absolutely refuse to take any carbon-based transportation out of a conviction that such action will always disproportionately contribute to the physical evils associated with climate change, provide unacceptable remote material support to fossil fuel corporations, and thus constitute a sort of moral evil. Similarly, a pilgrim might share the prophet's concerns and make every effort to limit carbon-based transportation. Nevertheless, a pilgrim might discern that the carbon pollution associated with a particular trip is justified by the good sought—especially if it can be paired with some kind of “countervailing action” like carbon offset purchasing.<sup>41</sup> For example, a diplomat might conscien-

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<sup>38</sup> Fossil Free, “Commitments,” [www.gofossilfree.org/divestment/commitments/](http://www.gofossilfree.org/divestment/commitments/).

<sup>39</sup> Atif Ansar, Ben Caldecott, and James Tilbur, *Stranded Assets and the Fossil Fuel Divestment Campaign: What Does Divestment Mean for the Valuation of Fossil Fuel Assets?* (Oxford: Smith School of Enterprise and the Environment, University of Oxford: 2013), 14.

<sup>40</sup> Damian Carrington, “Campaign Against Fossil Fuels Growing, Says Study,” *The Guardian*, October 7, 2013, [www.theguardian.com/environment/2013/oct/08/campaign-against-fossil-fuel-growing](http://www.theguardian.com/environment/2013/oct/08/campaign-against-fossil-fuel-growing).

<sup>41</sup> Kaveny, *Law's Virtues*, 263.

tiously pursue the good of climate change mitigation through an international climate treaty by flying to negotiate at the next Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC). Amidst such discernment, Kaveny emphasizes that the tension between prophets and pilgrims can inspire more robust moral reflection about participation in contemporary social structures. At the same time, however, she cautions that “what we must guard against at all costs is allowing creative tension to become mutually assured destruction.”<sup>42</sup>

At first glance, discussion of climate change and categories of evil may seem like an overly academic analysis without practical import. As this section demonstrates, however, these concepts can reveal important practical insights about the morality of climate change and direct corresponding action. First, reflection on climate change in terms of physical evil enables subsequent consideration of the topic with respect to moral evil. This, in turn, involves the concepts of vincible and invincible ignorance that together underscore the need for “ecological education” to adequately mitigate the climate crisis. Additionally, reflection on moral evil illustrates potential limitations to analyzing climate change with traditional Catholic notions of cooperation with evil. These inadequacies suggest a need to engage expanded notions of “structural complicity” that can better guide responses to the systemic dimensions of climate change.<sup>43</sup> In summary, attention to the Catholic categories of physical and moral evil can help persons more adequately and prudently address the climate emergency that threatens our common home.

### ADDITIONAL RESPONSES TO THE CLIMATE CRISIS

In addition to “ecological education” and greater moral attention to climate change as a structural reality, there are additional ways to effectively address the climate crisis. In real estate, they say the most important mantra is, “Location, location, location!” In solutions for climate change mitigation, the most important mantra is, “Communication, communication, communication!” One of the best things we can do to help our common home is have dialogue. This is something Pope Francis seems to understand. He opens *Laudato Si'* by stating his desire “to enter into dialogue with all people about our common home” (no. 3) and then uses the term “dialogue” twenty-four more times throughout the encyclical to stress the need for intercultural, interdisciplinary, interfaith—inter-*everything*—ecological discourse.

Following Pope Francis’s lead and responding to his call, adequate climate change mitigation will require us all start a conversation—

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<sup>42</sup> Kaveny, *Law’s Virtues*, 265.

<sup>43</sup> Kaveny, *Law’s Virtues*, 261.

multiple conversations, in fact. It will also require that our communications are strategic. There are multiple theories and robust literature about effective climate change communications,<sup>44</sup> but climate communicators all agree it is critically important to think about the person with whom you are talking. The number one rule in public speaking is to know your audience—and this is true about climate change communications. The message and content do not necessarily have to be entirely different, but perhaps how they are presented may need to change to be maximally effective. To this end, “meet people where they are at” and connect with them on common values. Frame the issue in ways that avoid controversy. It is science, after all—firmly established science—and not a belief system that fundamentally underpins climate change discussions (though the dialogue may eventually challenge one’s political, economic, or moral belief system). Climate change does or will touch every aspect of our life—our faith, our health, our natural world, and our economy. Find out what your audience cares about and start there.

For example, work through the Nebraska State Climate Office has shown that an extremely effective way to inspire action on climate change in this area is framing the issue in terms of extreme weather events and economics. We have also learned the importance of making the issue local and relevant along with emphasizing tangible solutions. However, we know that the issue can also be effectively framed for some audiences in terms of faith, concern for future generations, and student empowerment. Engaging here with a Catholic audience, it is especially important to emphasize that religious communities are often uniquely positioned to elevate the moral and spiritual dimensions of climate change. This is crucial on two fronts. First, as Donald A. Brown laments, moral language can inspire and animate action on climate change, but is often absent from public discourse usually dominated by political expediency and narrow economic calculus.<sup>45</sup> Second, the Catholic tradition emphasizes that “the fullness of faith,” to borrow a phrase from Michael and Kenneth Himes, requires that moral teaching must be underpinned by spirituality.<sup>46</sup> Or, as Pope Francis says in *Laudato Si’*,

More than in ideas or concepts as such, I am interested in how such a spirituality can motivate us to a more passionate concern for the protection of our world. A commitment this lofty cannot be sustained by

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<sup>44</sup> For example, see Matthew C. Nisbet, ed., *The Oxford Encyclopedia of Climate Change Communication* (Oxford: Oxford University Press, 2018); Yale Program on Climate Communication, “Research,” 2019, [www.climatecommunication.yale.edu/](http://www.climatecommunication.yale.edu/).

<sup>45</sup> See Donald A. Brown, *Climate Change Ethics: Navigating the Perfect Moral Storm* (New York: Routledge, 2013), 223-224.

<sup>46</sup> Michael J. and Kenneth R. Himes, *The Fullness of Faith: The Public Significance of Theology* (Mahwah, NJ: Paulist Press, 1993).

doctrine alone, without a spirituality capable of inspiring us, without an “interior impulse which encourages, motivates, nourishes and gives meaning to our individual and communal activity.” (no. 216, quoting *Evangelii Gaudium*, no. 261)

### CLIMATE CHANGE PLANNING AND ADAPTATION

A few weeks ago, as Dr. Shulski was giving a lecture about extreme events and preparedness in class, she asked her students, “When is the best time to plan for a tornado ... when the sirens are going off and one is heading your way?” They all gave a resounding, “No!” and one student followed up by saying, “That wouldn’t make sense. It’s best to have thought about it in advance—determine a secure location, have a severe weather kit with flashlights, batteries, water, food, medicines, infant needs.” Echoing this sentiment, Dr. Shulski pointed out how such foresight is why adults assess the best available information and then plan for things like retirement, health considerations, children’s education.

Like these obvious examples, the best available information clearly indicates that the consequences of climate change are already occurring and are likely to continue. Thus, whether we call it prudence, does the USCCB in *Global Climate Change: A Plea for Dialogue, Prudence, and the Common Good*, or the “precautionary principle” as Pope Francis in *Laudato Si’* (no. 186), we must plan for climate change. This is true in terms of both mitigation and adaptation: we must plan for how to minimize, if not avoid, future global warming and adapt to likely effects of our previous (and current) greenhouse gas pollution.

Here again, religious communities can play a crucial role by prioritizing in public discourse ethical and moral considerations that have unique potential to inspire mitigative and adaptive action. In *Laudato Si’*, Pope Francis emphasizes that “if we are truly concerned to develop an ecology capable of remedying the damage we have done, no branch of the sciences and no form of wisdom can be left out, and that includes religion and the language particular to it” (no. 63). This echoes the USCCB’s words in *Global Climate Change* wherein, more than a decade earlier, they stressed the need to “offer a distinctively religious and moral perspective to what is necessarily a complicated scientific, economic, and political discussion” since “ethical questions lie at the heart of the challenges facing us.” Pope Francis’s words also affirm those of his predecessor, Pope Benedict XVI, who in his encyclical *Caritas in Veritate* asserted, “*The Church has a responsibility towards creation and she must assert this responsibility in the public sphere*” (no. 51, emphasis in original).

In terms of mitigation, US Catholics can at present echo the USCCB’s faith-based climate advocacy and collaborate with Catholic

Climate Covenant to advocate in Congress for the International Climate Accountability Act (S. 1743) and the Energy Innovation and Carbon Dividend Act (H.R. 763).<sup>47</sup> With respect to adaptation, Catholics can echo the USCCB's emphasis that "any legislative action on climate change include provisions that: (1) ease the burden on poor people; (2) offer some relief for workers who may be displaced because of climate change policies."<sup>48</sup> These are just two examples of systems-level change, but they are clear indicators of how US Catholics now work—and must continue to work—to help society prudently plan for climate change.

## HOPE

Climate change is an unprecedented crisis for human civilization. Fortunately, humans are highly innovative. We traveled from the earth to the moon after about fifteen years of concerted effort. We have developed vaccines that keep populations healthy. Our technology has improved exponentially even in just the last few decades. Faced with the unprecedented climate crisis, we are finding ways to adapt—particularly in Nebraska, where some farmers with whom Dr. Shulski talks are *already* adapting. They are planting earlier because spring is warming overall. They are choosing different seed hybrids based on the changing climate. They are developing increased appreciation for the importance of sustainable agriculture practices, like cover crop planting, that conserve moisture, limit erosion, and improve soil health. So, in the face of catastrophic climate change, some Nebraska farmers are providing reasons to hope.

In addition to farmers, young people—especially our students—fill us with hope in the face of our climate crisis. One of the best parts of Dr. Shulski's job is teaching an introductory climate change course in the University of Nebraska-Lincoln's School of Natural Resources. In that course, she talks to her students about how the earth's climate is an interconnected system that includes everything: atmosphere, oceans, land, snow, and ice. She also talks with students about how one of the most crucial, complex, and unpredictable aspect of this system is *people*. Or, as Dr. DiLeo speaks with his students in reference to Pope Francis, "When we speak of the 'environment,' what we really mean is a relationship existing between nature and the society which

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<sup>47</sup> Catholic Climate Covenant, "Urge your Senators to Support Climate Action," 2019, catholicclimatecovenant.salsalabs.org/ShahenBillSupport/index.html; Catholic Climate Covenant, "Urge your Representative and Two Senators to Support (Co-sponsor) Energy Innovation and Carbon Dividend Legislation!" 2019, catholicclimatecovenant.salsalabs.org/SupportEIDCAAA/index.html.

<sup>48</sup> US Conference of Catholic Bishops, "Legislative Response to Climate Change," 2019, www.usccb.org/issues-and-action/get-involved/legislative-response-to-climate-change.cfm.

lives in it. Nature cannot be regarded as something separate from ourselves or as a mere setting in which we live. We are part of nature, included in it and thus in constant interaction with it” (*Laudato Si’*, no. 139). And our students get it. They understand that people are part of the climate system; that people are radically altering the climate in ways that devastate human and non-human creation; and they are inspired to act. And this inspiration gives us hope in the face of our climate crisis.

Alongside farmers and young people, the Catholic Church of which we are a part gives us hope amidst the climate emergency. Pope John Paul II, Pope Benedict XVI, and Pope Francis have all identified climate change as a moral issue and called for corresponding action. The USCCB engages in faith-based climate change advocacy. Catholic Climate Covenant and Creighton University have convened the three-part “*Laudato Si’* and the US Catholic Church: A Conference Series on Our Common Home” that brought more than two hundred people to Omaha. And those gathered at the inaugural gathering of this series are working to incorporate Church teaching on climate change into parishes, dioceses, schools, and other Catholic institutions across the United States. To be sure, there is much more that the US Catholic community can—and must—do to adequately and faithfully enact the Church’s ecological vision. But “the people of God” who constitute the Church and its apostolates give us hope amidst the climate crisis (*Lumen Gentium*, nos. 9-17).

Finally, the theological virtue of hope that anchors our Catholic tradition makes us optimistic that humanity might yet, with God’s grace, avoid total climate catastrophe. In *Laudato Si’*, Pope Francis soberly acknowledges what I (Dr. Shulski) and nearly every one of my colleagues in the climate science community do: “We can see signs that things are now reaching a breaking point” (no. 61). Immediately before this observation, however, the pope emphasizes that “hope would have us recognize that there is always a way out, that we can always redirect our steps, that we can always do something to solve our problems” (no. 61). Were this hope entirely rooted in human capacities, we likely would not share his optimism. Informed by the Catholic understanding of hope as the theological virtue through which we are empowered to seek God’s kingdom “relying not on our own strength, but on the help of the grace of the Holy Spirit,” however, we can remain sanguine about the potential for humanity to make the difficult and urgent choices needed to mitigate pending climate chaos (*Catechism*, no. 1817). Thus, as Pope Francis writes at the end of *Laudato Si’*, “May our struggles and our concern for this planet never take away the joy of our hope” (no. 244). **M**

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