

## ECOLOGICAL CONCERNS

*Anthony Le Duc, SVD*

Every age has its defining concerns that demand the attention of the deepest and brightest thinkers of the time. For the modern age, one of these preoccupations centers on the escalating global environmental crisis threatening to undermine human progress achieved thus far in economic and social development, and leave the next generation with a debilitated earth. The issue has grown into a dilemma that cannot be confined to a single or even a few sectors of society nor be adequately addressed simply by politicians or scientific experts. The global consensus is that an effective solution to ecological concerns requires an interdisciplinary, dialectical, and dialogical approach involving a diverse contingent of individuals, groups, organizations, and institutions. The tasks to be done include applying scientific and technological know-how to social, economic and legal policies, all of which must be undergirded by political will and religious and personal commitment to act on behalf of the environment. This essay examines the multi-dimensional environmental challenges in the context of a globalized world and the need for a collaborative framework in order to overcome these challenges for the benefit of future generations. The thesis here is that without a collaborative interdisciplinary approach, the efforts to address environmental woes will only be piecemeal and ultimately ineffective.

### *1. Overview of the Environmental Crisis*

“Environmental crisis”<sup>1</sup> is a general term that refers to the destabilizing situation taking place in the natural environment as a result of primarily negative human interference. The various interrelated components that make up the environmental crisis include anthropogenic climate change, also known as global warming (and related effects such as decrease in snowfall, extreme heat waves, rise in ocean level, etc.), the depletion of stratospheric ozone, deforestation, the acidification of surface waters, mass extinction of plant and animal species, and a grave decline in biodiversity. Although there are some detractors, the

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<sup>1</sup> The environmental crisis is also sometimes referred to as the ecological crisis to emphasize the destruction of the ecology due to human interference.

environmental crisis is considered a real concern in the mainstream circle of scientists. Environmental awareness began in the early 1960s when Rachel Carson published her book *Silent Spring* which brought to light environmental problems caused by indiscriminate use of pesticides.<sup>2</sup> Environmental awareness continued to grow in the following decades, and a major assessment entitled “Global Environment Outlook 2000” issued by the *UN Environmental Program* (UNEP) in 1999, made two critical observations for the new millennium:

First, the global human ecosystem is threatened by grave imbalances in productivity and in the distribution of goods and services. A significant proportion of humanity still lives in dire poverty, and projected trends are for an increasing divergence between those that benefit from economic and technological development, and those that do not. This unsustainable progression of extremes of wealth and poverty threatens the stability of the whole human system, and with it the global environment.

Secondly, the world is undergoing accelerating change, with internationally-coordinated environmental stewardship lagging behind economic and social development. Environmental gains from new technology and policies are being overtaken by the pace and scale of population growth and economic development. The processes of globalization that are so strongly influencing social evolution need to be directed towards resolving rather than aggravating the serious imbalances that divide the world today. All the partners involved—governments, intergovernmental organizations, the private sector, the scientific community, NGOs and other major groups—need to work together to resolve this complex and interacting set of economic, social and environmental challenges in the interests of a more sustainable future for the planet and human society.<sup>3</sup>

Nearly two decades have passed since the UNEP issued its assessment and the global state of the environment continues to be a matter of great concern. Despite the decrease in the rate of deforestation over the 25-year period from 1990 to 2015, the world still saw a net loss of 3% of

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<sup>2</sup> Rachel Carson, *Silent Spring* (Boston: Houghton Mifflin, 1962). The publication became the impetus for a great public outcry which forced the banning of the chemical DDT (dichloro-diphenyl-trichloroethane) and led to revolutionary changes in the laws affecting our air, land, and water.

<sup>3</sup> UNEP, *Global Environment Outlook 2000: Global State of the Environment Report* (New York: Oxford University Press, 1999), xx.

global forest area from 4128 million hectares to 3999 million hectares.<sup>4</sup> This statistic was presented by the FAO in its *Global Forest Resource Assessment 2015*, which also reports that three quarters of all forests today are found in high and middle income countries while just 25% are found in lower middle or low income countries. According to the World Wildlife Fund, about 17% of the Amazon forests have been destroyed in the last 50 years, largely as a result of converting woodlands to use for cattle ranching.<sup>5</sup> In addition, agriculture and logging are also major contributors to deforestation, which plays a significant role in global warming. When trees are felled, the carbon which is stored in them gets released and combines with greenhouse gases from other sources, the effect of which contributes to global warming. It is estimated that deforestation accounts for 15% of the total amount of greenhouse gas emissions. This is higher than the total emission by cars and trucks, which account for 14% of all carbon emissions.<sup>6</sup>

The *Millennium Ecosystem Assessment* published in 2005 also presented worrisome findings. It states that “Over the past 50 years, humans have changed the ecosystems more rapidly and extensively than in any comparable period of time in human history.”<sup>7</sup> The environmental degradation taking place in order to satisfy human needs for fresh water, food, timber, fiber, and fuel is largely irreversible and has contributed to an alarming loss of biodiversity. Over the last several hundred years, human beings have increased the rate of species extinction to as much as 1000 times the background rates typical over the planet’s history.<sup>8</sup> Some 10 to 30% of the mammal, bird, and amphibian species are facing the threat of extinction.

One of the most recent and widely consulted reports on the state of the environment, the “Climate Change Report 2014” issued by the *Intergovernmental Panel on Climate Change* (IPCC), warns that the situation has not improved, and there are risks of great harm to both human and natural systems. First, the report confirms that climate change is a real phenomenon, and it is influenced by human behaviors. According to

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<sup>4</sup> R. J. Keenan et al., “Dynamics of Global Forest Area: Results from the FAO Global Forest Resources Assessment 2015,” *Forest Ecology and Management* 352 (2015): 11.

<sup>5</sup> “Deforestation overview,” World Wildlife Fund, accessed October 11, 2016, <http://www.worldwildlife.org/threats/deforestation>.

<sup>6</sup> “Deforestation and its extreme effect on global warming,” *Scientific American*, accessed September 9, 2016, <https://www.scientificamerican.com/article/deforestation-and-global-warming/>.

<sup>7</sup> Millennium Ecosystem Assessment (MEA), *Ecosystems and Human Well-Being* (Washington, DC: Island Press, 2005), 1.

<sup>8</sup> MEA, *Ecosystems*, 4.

the IPCC, recent anthropogenic emissions of greenhouse gases are the highest in history. The changes observed are unprecedented over decades and even millennia. The average temperature has risen both in the atmosphere as well as on the earth's surface (ocean and land). The period from 1983 to 2012 was likely the warmest 30-year period in the last 1400 years in the northern hemisphere where this kind of assessment is possible. The amounts of snow and ice have decreased, while there is a corresponding increase in sea levels. From 1979 to 2012, the Arctic Sea ice-extent decreased at a rate in the range from 3.5 to 4.1% per decade. In the same period, it is estimated that Antarctic Sea ice-extent decreased at a rate in the range of 1.2 to 1.8% per decade. In the meantime, from 1901 to 2010, the global mean sea level rose by 0.19m. According to the IPCC, the dominant cause of climate change observed is anthropogenic greenhouse gases (GHG) such as carbon dioxide, methane, and nitrous oxide that have been released into the atmosphere with increasing rates since the pre-industrial age in accordance with population and economic growth. The report claims that the present level of greenhouse gases is at the highest concentration in at least the last 800,000 years.

The broad consensus among scientists, as reflected by the IPCC, is that the rising emissions of greenhouse gases will lead to increases in global mean temperatures. The globally averaged combined land and ocean surface temperature data as calculated by a linear trend shows a warming of 0.85[0.65 to 1.06]°C. It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forces coming together. In January 2017, both NASA and the National Oceanic and Atmospheric Administration declared that 2016 was the hottest year on record, and the third year in a row to take the number one slot.<sup>9</sup> If the present situation continues, by the end of the 21<sup>st</sup> century, temperature change over pre-industrial levels could exceed 2°C. Such a change, according to climate scientists, would have tremendous impact on human and natural systems, causing weather extremes, altered ecosystems and habitats, and risks to human health and society. More frequent and intense drought, storms, heat waves, rising sea levels, melting glaciers and warming acidic oceans can directly harm animals, destroy the places they live, and wreak havoc on people's livelihoods and communities.

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<sup>9</sup> A. Thompson, "2016 Was the Hottest Year on Record," *Scientific American* (January 18, 2017), accessed January 28, 2017, <https://www.scientificamerican.com/article/2016-was-the-hottest-year-on-record>.

Nowadays, it is no longer a daring stance to assert as in years past that the environmental crisis is largely due to human activities. Human consumption of natural resources and the subsequent wastes in solid, liquid and gaseous forms result in environmental degradation as reflected in numerous scientific reports. The project to measure what has been called the *Ecological Footprint* (EF) is an attempt to quantify how much pressure people put on nature through their activities. The Ecological Footprint is basically a value derived from the measurement of the demand exerted on nature by humanity against the planet's biocapacity—forests, pastures, cropland and fisheries, etc.—that make up the planet's biologically productive land areas. The value represents the area of productive land needed to provide humanity with the resources that it needs as well as to absorb the waste that is produced. The Ecological Footprint can be calculated for individuals as well as for entire populations. According to the Global Footprint Network, "Since the 1970s, humanity has been in ecological overshoot with annual demand on resources exceeding what Earth can regenerate each year."<sup>10</sup> In 2007 when the first EF report was released, it was said that the earth needed 1.5 years to regenerate the amount of resources used annually. The EF per person worldwide was calculated to be 2.6 global hectares (gha) while the biocapacity available was only 1.8 global hectares. A different picture of how resources are being used, however, can be seen when calculations are made on a national basis. For example, the United Arab Emirates (UAE) had the highest EF per capita at 10.3 gha. The average American, on the other hand, had an EF of 9.0 gha. While Americans per capita registered lower than the people of UAE, the United States had a much bigger population than the UAE resulting in a much greater use of resources overall. It is said that if everyone in the world were to live like the average American, five planets would be needed to supply the necessary resources to accommodate such a lifestyle. It was reported at that time that the US required 23% of world biocapacity, with China running closely behind with 21%. What China lacked in terms of per capita demand, it made up for with its tremendous population of over one billion people. In 2010, it was reported that China as a country had surpassed the US in energy use.<sup>11</sup>

In 2016, the Global Footprint Network released its "National Footprint Accounts" with updated and refined calculations of the world's Ecological Footprint. In its latest set of data with the most recent year

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<sup>10</sup> "Footprint Basics," Global Footprint Network, accessed December 1, 2016, [http://www.footprintnetwork.org/en/index.php/GFN/page/footprint\\_basics\\_overview](http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview).

<sup>11</sup> S. Swartz and S. Oster, "China tops U.S. in Energy Use," *The Wall Street Journal* (July 28, 2010), accessed September 17, 2016, <http://www.wsj.com/articles/SB10001424052748703720504575376712353150310>.

being 2012, the organization places the earth's biocapacity at 1.7 gha while the average EF is 2.8 gha. By country, the United States, although it has reduced its EF to 8.2, is still in a significant deficit because the US only has a biocapacity of 3.8 gha. Other countries have even greater deficits than the US. Singapore, for example, has a per capita EF of 8.0 gha versus a biocapacity of merely 0.1 gha—a deficit of 7.9 gha. Luxembourg has a deficit of a whopping 14.1 gha! All the other European countries included in the report also have deficits of various amounts. Asian countries with rapidly expanding economies such as China, India and Vietnam also see a strong jump in their EF per capita. However, Vietnam and Cambodia have been noted for their efforts to respond to the increase in EF by concomitantly building up their biocapacity per person in order to buttress the growth. Unfortunately, there are also many countries experiencing increasing EF per capita and decreasing biocapacity.

Although climate change is a global phenomenon, its impacts are not evenly distributed. The manifestations of climate change in the phenomena of gradual sea-level rises, greater unpredictable rain and storm patterns, and more weather extremes of hot and cold will affect most strongly low-income countries that are ill equipped to adapt to these drastic changes. In developing countries, the main means for livelihood is agriculture. Deviations in the climate, even minor ones, can have profound effects on farmers. Kenya is among the many African countries at risk to suffer tremendously from climate change as 70% of Kenya's GDP comes from agriculture and agriculture-related industries.<sup>12</sup> According to the *Global Climate Risk Index 2015*, in the period from 1994 to 2013, all ten countries that suffered the most from extreme weather events—both in terms of fatalities and economic losses—were developing countries in Asia and Latin America. Honduras, Myanmar and Haiti, the top three countries most affected, are among the low-income countries in the world.<sup>13</sup>

Besides developing countries being the ones most impacted by climate change, other groups often cited as “victims” include children and women. Elizabeth D. Gibbons articulates the negative consequences of climate change on children in terms of the effects on their physical and mental development:

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<sup>12</sup> T. Osborn, “Why Developing Countries are Disproportionately Affected by Climate Change—and What Can They Do About It,” *The Huffington Post* (January 20, 2015), accessed September 26, 2016, [http://www.huffingtonpost.com/tom-osborn/why-developing-countries-\\_b\\_6511346.html](http://www.huffingtonpost.com/tom-osborn/why-developing-countries-_b_6511346.html).

<sup>13</sup> S. Kreft et al., *Global Climate Risk Index 2015* (Bonn: Germanwatch, 2015), 4.

Children's bodies and minds are, by definition, developing and thus more susceptible than adults to effects of environmental stressors. Physiological and mental development can slow down or be halted by the unpredictable consequences of increased heat, rain, drought, natural disasters, and rising sea levels. Increasing rates of crop failure and flood-borne diseases leave children exposed to lifelong harm from malnutrition. The very nature of childhood means that children spend more time playing outside, close to the ground and exposed to the elements, than do adults; they depend on adults as their small stature and comparatively weak bodies leave them at a serious disadvantage when trying to escape floods, high winds, and other extreme weather events.<sup>14</sup>

Highlighting the issue of children is to recognize the exceptional circumstances of climate change, where actions that people carry out in the present for their own benefit conflict with the rights and well-being of people in the future. The environmental crisis exemplifies the issue of intergenerational justice which seeks answers to questions such as: What are the duties of the present generation to future generations, how are the rights of the future generations to be balanced with the rights of the people living in the present, and how ought natural resources to be managed in order to leave to the future generations a planet that is worthy to live on?<sup>15</sup>

The issue of gender also comes into play in the discourse on climate change and environmental degradation. In 2015, the Georgetown Institute for Women, Peace and Security released a study that highlighted that the social and physical consequences posed by climate change would have greater impact on women than men. Women were more likely to suffer death due to natural disasters and climate change-related events. Those who manage to survive these calamities remain vulnerable because they often lack legal assets and rights to property. Moreover, their ability to rebuild their lives is often hampered by lack of resources.<sup>16</sup> Despite facing more threats, women systematically lack the opportunity to participate in decision making regarding policies for the future.

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<sup>14</sup> E. D. Gibbons, "Climate Change, Children's Rights, and the Pursuit of Intergenerational Climate Justice," *Health and Human Rights Journal* 16 (2014): 19.

<sup>15</sup> UNICEF, *The Challenges of Climate Change: Children on the Front Line* (Florence: UNICEF, 2015), 57-58.

<sup>16</sup> Alam et al., *Women and Climate Change: Impact and Agency in Human Rights, Security, and Economic Development* (Washington, DC: Georgetown Institute for Women, Peace and Security, 2015), 18.

While the language of victimhood is used in regard to women and children, it has been noted that it would be mistaken to only perceive women and children in this manner. The writers of the above report affirm that “women have, continue to, and could serve as agents of mitigation and adaptation.”<sup>17</sup> As Tarja Halonen, former President of Finland stated, “[Women] are powerful agents whose knowledge, skills and innovative ideas support the efforts to combat climate change.”<sup>18</sup> Similarly, advocates affirm that children can also be seen as agents of change, and that it would be wrong to simply perceive children as helpless victims.

Children whose rights are violated or denied owing to the consequences of climate change could partner with their peers, human-rights defenders and climate change groups in order to initiate strategic litigation aimed at delivering broad social change in the interests of climate change mitigation and adaptation, as well as prevention and redress of environmental degradation.<sup>19</sup>

UNICEF urges partnering with and for young people in order to allow them to be “active and inspiring agents of global change towards a sustainable future for all of us.”<sup>20</sup>

## ***2. Environmental Crisis and Economic Globalization***

The environmental crisis—its origins and its escalation—is almost always discussed in the context of technological and economic developments. Some choose to trace the beginning as far back as over 10,000 years ago when pre-historic human beings switched from being nomadic hunter-gatherers to gradually becoming settlers engaged in agriculture, which kick-started a series of developments that led to the springing up of civilizations and brought about environmental consequences in the process.<sup>21</sup> Others choose to begin with the dawn of the industrial revolution some 300 years ago that saw a drastic increase in energy use in order to achieve high production of material goods for consumption.

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<sup>17</sup> Ibid., 9.

<sup>18</sup> “Gender Equality Must be Incorporated into all Matters Connected to Climate Change,” Equal Climate, accessed August 15, 2016, <http://www.equalclimate.org/en/background/President+of+Finland%2C+Tarja+Halonen%3A+Gender+equality+must+be+incorporated+into+all+matters+connected.9UFRrYYk.ips>.

<sup>19</sup> UNICEF, *Challenges*, 63.

<sup>20</sup> Ibid., 75.

<sup>21</sup> P. Dauvergne, “Globalization and the Environment,” in *Global Political Economy*, ed. J. Ravenhill (Oxford: Oxford University Press, 2014), 375.

Technological and economic developments brought modernity and prosperity to different parts of the world, especially in Europe and the United States, but they also facilitated the rapid rise of the global population as never seen in the past. The industrial revolution also brought air pollution to the cities like London and New York, extinction of countless species as their natural habitats were overtaken by human activities, and a host of other environmental problems that make up the environmental crisis as we see it today.

Past and current economic models, especially free market capitalism, have been deemed to exacerbate environmental woes. Rather than using the *human development index* as a criterion, free market capitalism resorts to growth of products to measure progress, forgetting that there are limits to economic growth, which to a certain point can negatively affect the quality of the environment as well as human society. Economic globalization which is characterized by liberalizing international economic relations in order to promote international trade, foreign direct investment, capital flows, flows of technologies, and international movement of workers, often looks to economic growth and rate of employment as macroeconomic indicators of progress. While economic globalization can help nations to develop technologically and increase national revenues, the process can also pose a threat of exploitation and degradation of environmental resources. Theoretically, economic growth can take place through technologies and structural changes that do not place high burdens on the environment in terms of production and services. However, in reality, it is usually the case with developing countries that economic growth is concomitant with an increase in the country's Ecological Footprint. At the same time, developed economies have long carried out activities that place great pressures on the global environment. In either case, one sees that the "environment is intrinsically linked to economic development, providing natural resources that fuel growth and ecosystem services that underpin both life and livelihoods."<sup>22</sup> Oil, timber, metals, etc. have been the raw materials that fueled global economic growth, and their use has grown exponentially by large developing economies like China and India. There cannot be any disagreement that these natural resources are limited. The thinking that nonrenewable resources in a finite system will always be around for human use, which continues to rise, is simply an illusion. Scientists say that the productive capacity of nature has already been exceeded by as much as 30%, while 60% of the ecosystems are currently overused. Sooner or later, the threats of dwindling stocks of natural re-

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<sup>22</sup> A. Najam et al., *Environment and Globalization: Five Propositions* (Winnipeg: International Institute for Sustainable Development, 2007), 7.

sources, which in the past have often turned out to be untrue, will be upon us.

Economic globalization does not necessarily have to generate only negative impact on the environment. Optimists point to a number of environmental opportunities that this process might bring. For example, as a result of economic growth, the increase in national revenue allows for resources allocated towards environmental protection. Second, development of “cleaner” technologies can enable us to extract more from nature without causing as much harm as previously seen. Third, global interactions create opportunities for exchanging environmental knowledge as well as methods that would safeguard the environment. These interactions would facilitate the development of a global environmental consciousness due to the emergence of global environmental networks and civil society movements. Environmentalism, therefore, can become a global norm rather than be reserved for a particular group of people as seen in the past.

While the discussion on the economic dimension of the environmental crisis often focuses on the impact of economic growth on the environment, one often fails to consider the potential economic losses of environmental degradation. Wang Hongchang has carried out a study of income loss in China as a result of deforestation, environmental pollution, and degradation of natural resources. In this study, “loss” was defined as the difference between potential and actual economic income resulting from environmental degradation. The result of this study, which estimated losses for the year of 1992, indicated that the total loss for the year was 382.61 billion yuan, representing 18.9% of China’s total national income for the year. Among the different forms of environmental degradation, deforestation accounted for the largest amount of income lost (12.1%).<sup>23</sup> In another study on China, the economic costs of death and illnesses associated with air pollution amounted to 157.3 billion yuan in 2003, or 1.16% of GDP.<sup>24</sup>

In the United States, the costs due to damage to natural systems and people by the use of pesticides in farming were estimated in 1990 to be \$8 billion per year.<sup>25</sup> In Australia, the cost of land and water degrada-

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<sup>23</sup> V. Smil and M. Yushi, “The Economic Costs of China’s Degradation,” American Academy of Arts and Sciences, accessed September 21, 2016, <https://www.amacad.org/content/Research/researchproject.aspx?d=961&t=4&s=0#toc>.

<sup>24</sup> The World Bank, *Cost of Pollution in China* (Washington, D.C.: The World Bank, 2007), xiii.

<sup>25</sup> M. A. Altieri, “Ecological Impacts of Industrial Agriculture and the Possibilities for Truly Sustainable Farming,” *Monthly Labor Review* 121, no. 7 (1998): 62.

tion has been estimated at \$2 billion per year.<sup>26</sup> DARA and the Climate Vulnerable Forum claimed in a study published in 2012 that climate change cost the world over 1.2 trillion dollars, or 1.6% of global GDP, in 2010. This cost may be more than doubled by 2030, amounting to 2.5% of global GDP.<sup>27</sup> Most recently, the United Nations published a paper authored by Tord Kjellstrom claiming that by 2030, the world economy could face a loss of two trillion dollars in productivity because it simply becomes too hot to work in certain parts of the world.<sup>28</sup> In just Southeast Asia alone, as much as 20% of annual work hours could be lost due to unbearable heat.

While it is uncertain whether the various calculations of economic loss due to environmental degradation are accurate, what they aim to persuasively demonstrate is that calculations of loss due to environmental degradation need to be figured into total revenue figures nationally and globally. This will present a more accurate picture of how much economic gain is truly realized in various economic ventures carried out by individual companies or governments. Awareness of economic loss due to environmental degradation also brings to mind what has been labeled as the “cost of inaction,” which is the economic consequence of not introducing environmental policies or doing so in a haphazard or untimely manner.<sup>29</sup>

### ***3. International Political Will in the Face of the Environmental Crisis***

The discourse on addressing the environmental crisis often makes references to local, national, and international “political will” and often highlights the need for more political will at all levels if the crisis is ever going to be resolved. The lack of political will is cited not only when it comes to the environmental crisis but a host of other social dilemmas from health care reform to official corruption that confront society. Tra-

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<sup>26</sup> S. Lockie, “Positive Futures for Rural Australia,” in *Rurality Bites: The Social and Environmental Transformation of Rural Australia*, ed. S. Lockie and L. Bourke (Annondale, NSW: Pluto Press, 2001), 287.

<sup>27</sup> DARA, *Climate Vulnerability Monitor: A Guide to the Cold Calculus of a Hot Planet* (Madrid: DARA International, 2012), 17.

<sup>28</sup> “Global Warming to Cost \$2 Trillion in Lost Productivity by 2030,” Voice of America, accessed December 1, 2016, <http://www.voanews.com/a/global-warming-cost-two-trillion-dollars-lost-productivity/3424781.html>.

<sup>29</sup> OECD, *Costs of Inaction on Environmental Policy Challenges: Summary Report* of the Meeting of the Environment Policy Committee at Ministerial Level. Environment and Global Competitiveness, 28-29 April 2008, accessed December 1, 2016, <https://www.oecd.org/environment/ministerial/40501169.pdf>, 3.

ditionally, political will is understood as the willingness by a governmental body to implement the necessary and appropriate policy by making use of its available institutional capacity to address a situation, in which it has adequate knowledge of impending consequences.<sup>30</sup> The scope of this essay does not make it possible to discuss the political will of particular national governments or institutions. However, the environmental crisis presents tremendous challenges to governmental bodies all over the world when it comes to balancing national interests with environmental sustainability. The problem of climate change, according to *The Economist*, is the “hardest political problem the world has ever had to deal with. It is a prisoner’s dilemma, a free-rider problem and the tragedy of the commons all rolled into one.”<sup>31</sup> Brian Spak outlines the following assessment of the difficulties involved:

People today bear the costs to mitigate the greenhouse gas emissions causing climate change, but future generations, by and large, experience the benefits. Likewise, local or national communities incur the cost to reduce emissions, but the benefits are realized globally. In addition, developed countries are responsible for most greenhouse gas emissions that exist in the atmosphere, but developing countries will be most impacted by climate change. The large developing countries, though not responsible for the lion’s share of emissions in the atmosphere, will nevertheless need to reduce their emissions in the future to avoid catastrophic climate change. Some of the countries, particularly those with territorial claims to mineral rights in Arctic sea beds, that stand to benefit from some level of climate change are also among the biggest emitters. Finally, high per-capita GDP correlates strongly with high per-capita emissions, and no large country has ever experienced lasting economic growth without simultaneously increasing emissions.<sup>32</sup>

It is because of these and other difficulties that despite over four decades of attempting to address environmental problems, progress has not been satisfactory. Environmental awareness heightened in the 1960s when for the first time humanity was able to see the earth from

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<sup>30</sup> L. Woocher, “Deconstructing ‘Political Will’: Explaining the Failure to Prevent Deadly Conflict and Mass Atrocities,” *Journal of Public and International Affairs* 12 (2001): 182.

<sup>31</sup> “Getting Warmer,” *The Economist* (December 3, 2009), accessed September 24, 2016, <http://www.economist.com/node/14994872>.

<sup>32</sup> B. Spak, “The Success of the Copenhagen Accord and the Failure of the Copenhagen Conference,” 2010, accessed December 2, 2016, <https://www.american.edu/sis/gep/upload/Brian-Spak-SRP-Copenhagen-Success-and-Failure.pdf>.

outer space. From afar, the earth seemed as fragile and vulnerable as it was beautiful. Global environmental problems first received serious attention in 1968 at the *United Nations Biosphere Conference*. This event was followed by the *United Nations Conference on the Human Environment*, held in Stockholm, Sweden, in June 1972. Although this meeting was attended by over 1,200 delegates from more than 100 countries, only two countries sent their heads of state to the event—Swedish Prime Minister Olaf Palme and Indian Prime Minister Indira Gandhi. In this meeting, tensions between the northern developed states and the southern developing states were obvious. While the North wanted to address environmental problems that arose out of economic development, the South was anxious about the North forcing unfair terms of trade onto the South and preventing it from economic and industrial development. While the discussions did lead to a group consensus that addresses both northern concerns for global environment and southern need for economic development, the resolutions and declarations that came out of the conference contained few practical commitments towards change.<sup>33</sup> Something substantial did take place after the Stockholm Conference, which was the creation of the *United Nations Environment Program* (UNEP) the following year. For the next two decades following Stockholm, scholars continued to carry out research on environmental issues. Various protocols and conventions were developed at the international level addressing issues such as ozone depletion and hazardous waste. The concept of sustainable development, which was introduced years earlier, was officially defined in 1987 by the *World Commission on Environment and Development* (Brundtland Commission) as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”<sup>34</sup>

While the issue of the environment did not get lost among other global concerns, at times it did suffer from lack of attention during the late 1970s until the late 1980s. It was not until 1989 that the United Nations resolved to hold what came to be known as the *United Nations Conference on Environment and Development* (UNCED) or more popularly the *Earth Summit* in Rio de Janeiro, Brazil, in 1992. Unlike the Stockholm Conference, this gathering had 117 heads of state as well as thousands of participants from non-governmental organizations. The largest UN conference to date was hailed by many as a great success

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<sup>33</sup> Dauvergne, “Globalization,” 378.

<sup>34</sup> See World Commission on Environment and Development (1987). *Report of the World Commission on Environment and Development: Our Common Future*. Retrieved from <http://www.un-documents.net/our-common-future.pdf> on December 19, 2016.

because it resulted in a host of documents that articulated the rights and responsibilities of states, and outlined principles and an action program to promote sustainable development, as well as creating two conventions—the *United Nations Framework Convention on Climate Change* and the *Convention on Biological Diversity*. This conference also resulted in the establishment of the *UN Commission on Sustainable Development* to monitor and evaluate progress on implementing the objectives laid out at Rio. However, one of the biggest criticisms was that the funds “promised” by various countries, especially from the North, were not nearly enough to respond to the 300-page action program called *Agenda 21*. The *Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests*, which originally was intended to be a legally binding document, finally ended up being non-legally binding due to irreconcilable differences over the terms of the agreement.

After the grand display at Rio, environmental issues again slipped to the background as the international community turned its attention to other matters that required its attention, such as global terrorism and the global financial crisis. When the world came together for the *World Summit on Sustainable Development* in Johannesburg, South Africa, a decade later, despite the fact that there were even more delegates and participants than at the Rio Summit, only about 100 heads of state attended the gathering—fewer than at Rio. This latest event once again refocused the international community on the environmental problem, affirmed the need for sustainable development, and added new dimensions to the entire environmental discourse with its discussion on the role of globalization in contributing benefits as well as negative effects on the situation. Nonetheless, critics saw this meeting, as well as the last two, as not having enough content to stem the tide of ecological destruction or restrain the economic mechanisms that lead to environmental degradation.

The criticisms towards international action on behalf of the environment are not unjustified considering the lack of unity and consistency in how the international community has come together on the major environmental issues. Despite the *United Nations Framework Convention on Climate Change* (UNFCCC) having entered into force many years ago, the task of establishing a global plan to reduce emissions that would be accepted by all the major emitters has been a monumental challenge. The *Kyoto Protocol*, which was adopted in 1997 and entered into force in 2005, represented a global effort to reduce emissions in the developed world; however, it has never been ratified by the United States, which until recently was the world’s largest emitter. The failure of the international community to come to a consensus was put

on spectacular display at the 15<sup>th</sup> session of the UNFCCC in Copenhagen in 2009. Despite mounting scientific evidence of global warming that required urgent and decisive action, in the end it seemed that politics trumped science. Some placed the blame on the inability of US president Barack Obama to persuade the US Congress to adopt more extensive pledges. Others blamed China for obstructing the negotiations. Still others blamed both China and the US. Either way, all agreed that Copenhagen was a disaster because the majority of the 45,000 delegates, comprising members of civil society, faith groups, business and industry, the investment community, scientists, engineers and professional organizations who attended this climate summit, all felt that it was time for a new global agreement on climate change. However, what they ended up getting was a last-minute backroom agreement, in the form of a meager three-page document, drafted by the United States and the BASIC countries (China, India, South Africa, and Brazil). The accord is a non-legally binding agreement that does not commit countries to agree to a binding successor to the Kyoto Protocol, which ended in 2012. The accord itself set no real targets to achieve in emission reduction. While the agreement stated that there would be mobilization of 100 billion dollars annually to developing countries for the purpose of mitigation and adaptation, this would not occur until 2020, and there was no specification of where these funds would actually come from. Critics also contended that the actual amount needed would be three or four times as much as what had been proposed. In the end, this accord was simply “noted” rather than adopted by the governments participating in the conference. In a commentary on *BBC News*, Malini Mehra characterized the outcome as an “agreement for business-as-usual.”<sup>35</sup> Mehra wrote, “The Copenhagen Accord is a cruel blow for millions around the world who had put their faith in their leaders to deliver on climate protection.” Nowhere was the lack of political will so disastrously on display as in what took place in Copenhagen in December 2009.

The international community, however, did have a chance to redeem itself in December 2015 at the *Paris Climate Conference* (COP21) where an agreement on greenhouse gas emissions mitigation, adaptation and finance starting in the year 2020 was negotiated. On the opening day of November 30, over 150 heads of state and government congregated in Paris—the largest attendance ever witnessed at a UN event on a single day. In the opening address, François Hollande, the president of France, remarked, “Never before has a conference received so many authorities from so many countries. And never—truly never—have the stakes of an

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<sup>35</sup> M. Mehra, “Copenhagen—The Munich of Our Times?” *BBC News* (February 2, 2010), accessed September 27, 2016, <http://news.bbc.co.uk/2/hi/science/nature/8490935.stm>.

international meeting been so high. For the future of the planet, and the future of life, are at stake.”<sup>36</sup> The UN Secretary General Ban Ki-Moon reminded the delegates in attendance of the meaning of the momentous occasion: “We have never faced such a test. But neither have we encountered such great opportunity. You have the power to secure the well-being of this and succeeding generations.”<sup>37</sup> Ban tried to convince the national leaders in attendance that bold climate actions were ultimately beneficial to their national interests. Part of the bold actions that the UN Secretary General was referring to include those needed to limit global temperature rise to below 2°C. The IPCC has indicated that even a 2°C change would already present serious economic, social and political consequences to the world. Exceeding this limit would prove disastrous. According to climate scientists, the goal should be to keep temperature rise to about 1.5°C. If this was to be achieved, according to Ban Ki-Moon, there needed to be four criteria:

First, the agreement must be durable. It must send a clear signal to markets that the low-emissions transformation of the global economy is inevitable, beneficial and already under way.... Second, the agreement must be dynamic. It must be able to accommodate changes in the global economy, and not have to be continually renegotiated.... The third requirement for success is an agreement that embodies solidarity with the poor and most vulnerable. It must ensure sufficient and balanced adaptation and mitigation support for developing countries. Fourth, the agreement must be credible. Current ambition must be the floor, not the ceiling, for future efforts. Five-year cycles, beginning before 2020, are crucial.<sup>38</sup>

Whether because of the desire to make up for the Copenhagen disaster, or pressure exerted by international public will, or ripened environmental consciousness, COP21 concluded on December 12, 2015 with the *Paris Agreement* (PA) adopted by 195 countries and the EU. Along with the PA was the COP decision entitled Paris Decision, which addresses details and work programs related to the PA, as well as issues related to the pre-2020 period. The agreement, expected to enter into force in 2020, is the result of negotiations that spanned nearly a decade

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<sup>36</sup> “COP21 Opening Speech: President François Hollande,” accessed September 26, 2016, <http://www.ambafrance-rsa.org/COP21-opening-speech-President-Francois-Hollande>.

<sup>37</sup> “COP21: Ban Ki-Moon Full Speech at Start of Paris Climate Change Talks,” accessed September 26, 2016, <http://www.ibtimes.co.uk/cop21-ban-ki-moon-full-speech-start-paris-climate-change-talks-1531133>.

<sup>38</sup> Ibid.

under the UNFCCC. Unlike the outcomes at the previous conferences, the Paris Agreement is legally binding, and was open for signature in April 2016. The allotted time for signing to take place is a year, after which a sufficient number of parties must ratify before it enters into force. By October 2016, the three largest emitters in the world—China, the US, and India—had already ratified the agreement.

One of the benchmarks of the Paris Agreement is the specific target of holding temperature rise “well below” 2°C as compared to pre-industrial levels, and even pursuing efforts to stay below 1.5°C by 2100. In order for such an objective to be achieved, a long-term emission reduction program must be implemented by both developed and developing countries. While the global emission rate should peak “as soon as possible” and then rapidly decline, the peaking schedule will vary from country to country, depending on the level of development of the particular country. The effort to curb emissions, under the agreement, is not regulated by a central committee, but by each country’s own government in a program called “nationally determined contributions” (NDCs). Each country is expected to submit its own NDCs upon ratification at the latest. While submitting the NDCs is prescriptive, fulfilling them is not legally binding. The Paris Agreement only asks that the parties pursue measures “with the aim of achieving the objectives of such contributions.” The timeframe for submitting the NDCs is also not uniformly determined. Some countries submitted programs for implementation up to 2025, others up to 2030. Some will begin in 2020, others in 2021.

The lack of uniformity in the details of the Paris Agreement as well as the lack of any enforcing agency for the implementation of the NDCs, needless to say, has garnered some criticism. Based on the NDCs that were handed in before Paris, it seemed unlikely that the effort to stay below the 2°C threshold would be possible, even less so for the 1.5°C target. If the NDCs do not become more bold and ambitious over time, there would be no chance of achieving the set objective. Countries are expected to submit NDCs every five years, each successive submission to be more substantial than the previous one. However, there is no body to assess the ambition of individual NDCs.

The financial issue was also a disappointing part of the Paris Agreement for many people. The Copenhagen Accord had specified an amount of 100 billion dollars to be mobilized to support developing countries in mitigation and adaptation. The Paris Agreement, however, neither made any reference to this commitment nor any other quantified financial obligations. What the Paris Agreement had left out, the Paris Decision picked up by referring to the 100 billion as a goal which developed countries “intended” to achieve by 2025. Before the year is up, however, a new goal will be set in which the USD 100 billion will

serve as the floor. The Paris Agreement itself does little more than “encourage” voluntary support from developed countries and mobilizing climate finance from multiple sources. Despite this and other flaws of the Paris Agreement, many saw it as real progress. Kumi Naidoo, executive director of Greenpeace International, commented:

It sometimes seems that the countries of the UN can unite on nothing, but nearly 200 countries have come together and agreed on a deal. Today, the human race has joined in a common cause. The Paris Agreement is only one step on a long road and there are parts of it that frustrate, that disappoint me, but it is progress. The deal alone won't dig us out of the hole that we're in, but it makes the sides less steep.<sup>39</sup>

While the Paris Agreement represents progress in the global effort to address the environmental crisis, the true test of political will will be seen in how each country, especially the major emitters, implement their NDCs and support developing countries in their effort to curb emissions without jeopardizing technological and economic development. The political will will also be tested in each national government's ability to resist the forces exerted by climate change deniers and political groups and parties who have a vested interest in this denial. The withdrawal of the United States headed by President Donald Trump from the Paris Agreement on June 1, 2017, represents the first great challenge for the sustainability and durability of this international effort to rectify climate change issues. At least in the near future, the agreement will have to be implemented without the leadership and cooperation of the largest economy in the world, a reality that may have tremendous impact on the attitude and morale of other nations who take their cue from the United States as they determine their own level of commitment to the agreement. As long as individuals and governments succumb to the rhetoric of climate change deniers, there will always be a basis and rationale for not fully adopting full-fledged sustainable development programs. Overconsumption and environmentally destructive behavior will continue to be socially acceptable while the political will to implement sustainable development programs will suffer.

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<sup>39</sup> F. Harvey, “Paris Climate Change Agreement: The World's Greatest Diplomatic Success,” *The Guardian* (December 14, 2015), accessed September 26, 2016, <https://www.theguardian.com/environment/2015/dec/13/paris-climate-deal-cop-diplomacy-developing-united-nations>.

#### 4. *Religious Contribution to Environmental Concerns*

In the modern globalized world, one of most persistent and stable dimensions of human life continues to be religious belief. This was affirmed by a major study conducted by the Pew Research Center (2010),<sup>40</sup> the results of which indicated that the overwhelming majority (84%) of the global population continues to maintain a religious affiliation. Of the remaining 16% who reported no religious affiliation, many indicated that they held religious or spiritual beliefs such as in God or some transcendent power. Despite the dire centuries-old prediction that scientific and technological modernization would eventually lead to the eradication of the *homo religiosus*, it seems that he has refused to expire on schedule. Although the process of secularization has been observed in different parts of the world, in this first part of the third millennium the world is still overwhelmingly religious even if the “religious gene” in the people of the Western part of the world has apparently undergone some mutations. Empirical evidence, nonetheless, indicates that no society in the past or present—even the most technologically advanced—is without the presence of religion.<sup>41</sup> The persistence of religion in society seems to be inextricably tied to the human effort to strive to achieve change and transformation in all dimensions of life. The *homo religiosus* is not satisfied with only social and material transformation as reflected in scientific and technological progress, but also aspires to what Frederick Streng calls “ultimate transformation,” encompassing the personal, social, political, and the cosmic transformation that changes the very core of the human being. According to Streng, religion serves as the means for this kind of transformation. He writes: “An ultimate transformation is a fundamental change from being caught up in the troubles of common existence (sin, ignorance) to living in such a way that one can cope at the deepest level with those troubles. That capacity for living allows one to experience the most authentic or deepest reality—the ultimate.”<sup>42</sup>

The desire for integral transformation allows human beings to continually reflect on their present situation and strive to correct deficiencies in their lives. Religions naturally have the tools to help facilitate

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<sup>40</sup> See <http://www.pewforum.org/2012/12/18/global-religious-landscape-exec/>.

<sup>41</sup> One may argue that even in societies where conventional religion is greatly diminished, many of the internalized values essential to the community are those rooted in religion. In other instances, conventional religion is replaced by other ideologies such as nationalism that arguably have some of the same characteristics as religion, such as transcendence, ritual, etc.

<sup>42</sup> F. Streng, *Understanding Religious Life* (Belmont, CA: Wadsworth Publishing, 1984), 2.

the process of self-cultivation in order to address personal and communal issues in society. Modern-day environmental concerns easily fall into the category of issues that religions could help to address. Unfortunately, the role of religion in this way has not always been valued. Oftentimes, emphasis is placed on the conflicts that stem from religious differences and intolerance, and how religious violence is the cause for the failure of particular development endeavors.<sup>43</sup> The havoc caused by religious extremist organizations such as the Islamic State (IS) or Hindu and Christian fundamentalists has fueled the idea in the general population, and even among academics of various disciplines, that religion is particularly violence-prone.<sup>44</sup> Development institutions and agencies, when choosing religious partners, prefer those that are seen as having humanistic leanings without strict creeds and codes. Nonetheless, as religions come in all stripes and forms and play a major part in the lives of the vast majority of the people in the world, on the practical level, they cannot be excluded from an effort such as solving the environmental crisis and promoting environmental sustainability. Religions themselves have a vested interest in the human lot, and see the contribution of the religious perspective in social development as a natural aspect of the religious task. In particular, Catholic social teaching has been a significant force in advocating for social justice and calling for integral human development. Pope Francis, for example, states in his 2014 World Day of Peace Message that authentic development is not about “mere technical know-how bereft of ideals and unconcerned with the transcendent dimension of man.”<sup>45</sup>

Environmental concerns in the last several decades have increasingly become a religious preoccupation because of the connection between environmental sustainability and human well-being. The historian Lynn White Jr. sees religion relevant in addressing the crisis because what people do about their ecology depends on what they think about themselves in relation to things around them. According to White, “Human ecology is deeply conditioned by beliefs about our nature and destiny—that is, by religion.”<sup>46</sup> How we interpret our own story and our destiny as well as how we relate to other human beings and to nature is

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<sup>43</sup> J. Ogbonnaya, *African Catholicism and Hermeneutics of Culture: Essays in the Light of African Synod II* (Eugene, OR: Wipf and Stock, 2014), 55.

<sup>44</sup> W. T. Cavanaugh, *The Myth of Religious Violence* (Oxford: Oxford University Press, 2010), 4.

<sup>45</sup> Pope Francis, “World Day of Peace Message 2014,” accessed January 6, 2017, [http://w2.vatican.va/content/francesco/en/messages/peace/documents/papa-francesco\\_20131208\\_messaggio-xxvii-giornata-mondiale-pace-2014.html](http://w2.vatican.va/content/francesco/en/messages/peace/documents/papa-francesco_20131208_messaggio-xxvii-giornata-mondiale-pace-2014.html).

<sup>46</sup> L. White Jr., “The Historical Roots of Our Ecologic Crisis,” *Science* 155, no. 3767 (1967): 1205.

always informed by our religious belief. Because of the fundamental role of religious beliefs in human life as “primordial, all-encompassing, and unique” world views, they have the ability to mobilize the human will and effort in order to achieve desired transformations.<sup>47</sup> E. N. Anderson asserts that “All traditional societies that have succeeded in managing resources well, over time, have done it in part through religious or ritual representation of resource management.”<sup>48</sup> The Muslim scholar Seyyed Hossein Nasr points out that the reality of the vast majority of the peoples of the world still living within a religiously bound universe means that religious ethics remain the most practical vehicle for solving the environmental crisis. Nasr writes:

The fact remains that the vast majority of people in the world do not accept any ethics which does not have a religious foundation. This means in practical terms that if a religious figure, let us say, a *mulla* or a *brahmin* in India or Pakistan, goes to a village and tells the villagers that from the point of view of the *Shari’ah* (Islamic law) or the Law of Manu (Hindu law) they are forbidden to cut this tree, many people would accept. But if some graduate from the University of Delhi or Karachi, who is a government official, comes and says, for rational reasons, philosophical and scientific reasons, that it is better not to cut this tree, few would heed his advice.<sup>49</sup>

When it comes to the environmental crisis, intellectual awareness and scientific know-how are not enough to solve the problem. In the decades following a major gathering of representatives of governments, scientific and social institutions, and major nongovernmental organizations (NGOs) in Stockholm in 1972, much has been done to publicize the truth of the crisis. However the problem remains and the world is not yet heading out of danger. In this first United Nations meeting, scientists made powerful presentations about the consequences of the destruction of rainforests by countries who were selling their resources out of poverty and opportunism. The presentations, instead of contributing to assuaging the problem, actually gave ideas to politicians and business people in a number of countries about ways to make money previously unknown to them. After this particular event, the world ac-

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<sup>47</sup> M. E. Tucker and J. Grim, “Series foreword,” in *Buddhism and Ecology*, ed. M. E. Tucker and D. R. Williams (Cambridge: Harvard University Press, 1997), xi-xii.

<sup>48</sup> Quoted in Tucker and Grim, “Series foreword,” xviii.

<sup>49</sup> S. H. Nasr, “Religion and the Environmental Crisis,” in *The Essential Seyyed Hossein Nasr*, ed. W. C. Chittick (Bloomington: World Wisdom, 2007), 31.

tually witnessed a jump in forest depletion.<sup>50</sup> On the other hand, religious involvement has been seen to be effective in promoting an environmental agenda throughout the world. In Tanzania, for example, fishermen on an island off the country's coast changed their fishing methods to a more sustainable habit after they were instructed by their imam that the method they were presently using was destructive to the environment and went against the teaching of the Qur'an. The Muslim religious leader was able to do what government officials and international groups for years had tried to accomplish without success.<sup>51</sup> The case of the fishermen in Tanzania and many other cases of effective religious intervention in addressing issues of justice, peace, and environmental sustainability demonstrate that the role of religion cannot be excluded from the discourse on the analysis of globalization and sustainable human and environmental development. Max Stackhouse opines that "The neglect of religion as an ordering, uniting and dividing factor in a number of influential interpretations of globalization is a major cause of misunderstanding and a studied blindness regarding what is going on in the world."<sup>52</sup> Fortunately, as religious leaders have begun to take more proactive roles in involving themselves in the environmental discourse, the presence of religion in the conversation has garnered more attention than before. Even in communist China, there is a resurgence of public interest in Buddhism, Confucianism and Daoism and how these traditions can affect the course of national development.<sup>53</sup>

The role of religion is not over and against the secular disciplines; rather religion serves as part of the dialogical and collaborative effort aimed towards devising a multi-dimensional and effective program of action on behalf of the environment. It is not entirely coincidental that the 195 member states of the United Nations adopted the *Sustainable Development Goals* (SDGs) after Pope Francis' address to the UN General Assembly on September 25, 2015, in which he spoke forcefully about the need to care for the earth as humanity's common home. The Papal Encyclical *Laudato Si'* released in June 2015 as well as his environmental advocacy was judged by many as influential in the proceed-

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<sup>50</sup> M. Palmer and V. Finlay, *Faith in Conservation: New Approaches to Religion and the Environment* (Washington D.C., World Bank, 2003), xiv-xv.

<sup>51</sup> E. Barclay, "African Fishermen Find Way of Conservation in the Koran," *The Christian Science Monitor* (October 31, 2007), accessed February 26, 2016, <http://www.csmonitor.com/2007/1031/p01s04-woaf.html>.

<sup>52</sup> M. L. Stackhouse, *God and Globalization: Volume 4: Globalization and Grace* (New York: Continuum Publishing Group, 2007), 57.

<sup>53</sup> J. Sawyer, "Introduction," in *Ecological Civilization*, ed. J. Sawyer and D. Jin (Beijing: Pulitzer Center, 2015), Kindle edition.

ings at the Paris Conference and the subsequent endorsement of the Paris Agreement on Climate Change. In that conference, Pope Francis was quoted at least ten times in speeches delivered by country leaders.<sup>54</sup> As the conference was taking place, *Time Magazine* published an article authored by Christopher J. Hale calling on world leaders to heed the message of Pope Francis. Hale writes:

Pope Francis has laid the groundwork for clear and effective action in Paris. He's also pointed a new way forward for discussion. Climate change policy discussions too often happen from above. Francis wants them to begin from below. Citing the "ecological debt" rich countries owe poor countries, Francis wants to make sure policy makers put developing countries in the center of the decision making.<sup>55</sup>

Of course, the role and hard work by countless NGOs and individuals such as the UN Secretary General, Ban Ki Moon, and the Executive Secretary of the UNFCCC, Christiana Figueres, cannot be denied. In this particular situation, however, one sees clearly that political will also needs a big dose of religious inspiration.

The collaborative framework is not only visible in the cooperation between religion and politics, but extends to the field of science as well. In the preparation process for *Laudato Si'* (2015), Pope Francis and his collaborators consulted extensively with scientists. The act of listening to the scientific community and presenting information based on scientific consensus is reflected in the very first chapter of the encyclical. Here the pope writes, "A very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climatic system"<sup>56</sup> and that "a number of scientific studies indicate that most global warming in recent decades is due to the great concentration of greenhouse gases (carbon dioxide, methane, nitrogen oxides and others) released mainly as a result of human activity."<sup>57</sup> According to Mary Evelyn Tucker and John Grim, Pope Francis' encyclical "has elevated the level of visibility and efficacy of this conversation between science and

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<sup>54</sup> J. Ware, "COP21: *Laudato Si'* a Major Talking Point at Climate Change Talks in Paris," *The Tablet* (December 6, 2015), accessed December 1, 2016, <http://www.thetablet.co.uk/news/2885/0/cop21-laudato-si-a-major-talking-point-at-climate-change-talks-in-paris>.

<sup>55</sup> C. Hale, "World Leaders Must Listen to Pope Francis on Climate Change," *Time Magazine Online* (December 2, 2015), accessed December 12, 2016, <http://time.com/4132104/paris-climate-conference-pope-francis/>.

<sup>56</sup> Pope Francis, *Laudato Si'* (Vatican City: Libreria Editrice Vaticana, 2015), no. 23.

<sup>57</sup> *Ibid.*

religion as perhaps never before on a global level.”<sup>58</sup> The role of religion and religious leaders like Pope Francis in the environmental discourse has been recognized by scientists and environmental philosophers as well. Prominent scientists such as Thomas Lovejoy, E. O. Wilson, Jane Lubchenco, Peter Raven, and Ursula Goodenough understand that religious and cultural values play important roles in addressing environmental concerns. Holmes Roston III asserts that science and religion need to enter into dialogue on the matter of the environment because there are fundamental human concerns that are relevant to both spheres: “Both science and religion are challenged by the environmental crisis, both to reevaluate the natural world and to reevaluate their dialogue with each other. Both are thrown into researching fundamental theory and practice in the face of an upheaval unprecedented in human history, indeed in planetary history.”<sup>59</sup>

The dialogue which religion enters into with scientists, sociologists, and political leaders nonetheless must begin with a deliberative process that takes place internally so that it is able to formulate coherent ethical ideas appropriate to present concerns. Environmental theologians such as Thomas Berry<sup>60</sup> advocate that just as religious ethics have been advanced on genocide, homicide and suicide, religions must also develop ethics that address biocide and ecocide. Mary Evelyn Tucker and Jim Grim suggest that this developmental process comprises three aspects: retrieval, reevaluation and reconstruction. In retrieval, theologians and religious experts peruse scriptural and commentarial sources in order to uncover and highlight aspects of the tradition that are relevant to human-Earth relations as well as identify applicable ethical codes for practice. Reevaluation involves the examination of traditional teachings, customs, and religious tendencies and models of ethics in order to discover their impact on the environment. Finally, reconstruction involves the creative effort by religions to adapt their teachings to address the contemporary circumstances.

This deliberative process is no small challenge for religions. To address ecological issues, the religious traditions must maneuver between “bilingual languages, namely, their languages of transcendence, enlightenment, and salvation” and the “languages of immanence, sacred-

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<sup>58</sup> M. E. Tucker and J. Grim, “The Movement of Religion and Ecology,” in *Routledge Handbook of Religion and Ecology*, ed. W. Jenkins, M. E. Tucker and J. Grim (New York, NY: Routledge, 2017), Kindle edition.

<sup>59</sup> H. Roston III, “Science and Religion in the Face of the Environmental Crisis,” in *The Oxford Handbook of Religion and Ecology*, ed. R. S. Gottlieb (New York: Oxford University Press, 2006), 376.

<sup>60</sup> See T. Berry, *The Sacred Universe: Earth Spirituality and Religion in the 21<sup>st</sup> Century* (New York: Columbia University Press, 2009).

ness of Earth, and respect for nature.”<sup>61</sup> Even within the same Christian tradition, very different conclusions have been arrived at on the issue of the environment. For example, on April 27, 2015, prior to the release of *Laudato Si'*, Pope Francis received an open letter from the Cornwall Alliance which raised concerns about the accurateness of some of the climate science. It claimed that empirical evidence suggests that there was “no rational basis to forecast dangerous human-induced global warming, and therefore no rational basis for efforts to reduce warming by restricting the use of fossil fuels or any other means.”<sup>62</sup> The letter also questioned the validity of the worldviews underpinning some of the policies advanced by environmental advocates. The stance of the Cornwall Alliance is clearly distinguishable from that of the UK-based Christian evangelical coalition called Operation Noah. In a document entitled “Climate Change and the Purposes of God,” the coalition asserted that taking responsibility for the well-being of creation and acting justly to the poor who suffer from the consequences of environmental degradation are integral to the gospel message.<sup>63</sup>

Despite differences, one increasingly finds that there is greater consensus within and across religious traditions on environmental concerns. This is nowhere more evident than the witness exhibited by Pope Francis and the Ecumenical Patriarch Bartholomew who have joined hands in calling for the care of creation. Not only did Pope Francis quote the leader of the Orthodox Church in *Laudato Si'*, in 2015 he also instituted the *World Day of Prayer for Care of Creation* to be celebrated on September 1, which the Orthodox Church has done since 1989. Patriarch Bartholomew commented, “We count it as a true blessing that we are able to share a common concern and a common vision for God’s creation.”<sup>64</sup> In the common declaration by the two church leaders on the occasion of meeting in Jerusalem in 2014, they stated:

It is our profound conviction that the future of the human family depends also on how we safeguard—both prudently and compassionately, with justice and fairness—the gift of creation that our Creator has entrusted to us. Therefore, we acknowledge in repentance the wrongful mistreatment of

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<sup>61</sup> Tucker and Grim, “Movement,” Kindle edition.

<sup>62</sup> “An Open Letter to Pope Francis on Climate Change,” Cornwall Alliance, accessed October 11, 2016, <http://cornwallalliance.org/anopenlettertopopefrancisonclimatechange/>.

<sup>63</sup> “Climate Change and the Purposes of God,” Operation Noah, accessed October 11, 2016, <http://operationnoah.org/articles/read-ash-wednesday-declaration/>.

<sup>64</sup> “Patriarch Bartholomew on Pope Francis’ climate encyclical,” *Time Magazine*, retrieved from <http://time.com/3926076/pope-francis-encyclical-patriarch-bartholomew/> on October 11, 2016.

our planet, which is tantamount to sin before the eyes of God.<sup>65</sup>

Indeed, on numerous occasions in writings as well as speeches, both leaders have emphasized the need for people to recognize their culpability in environmental degradation and taking the step to confess their environmental sins. The environmental sins that the two church leaders mention reflect part of what Pope John Paul II continually emphasized throughout his papacy—the culture of death. For Pope John Paul II, the culture of death not only includes the lack of respect of human life in all its stages but also the lack of respect for nature as reflected in the “technical and scientific way of thinking, prevalent in present-day culture [that] rejects the very idea that there is a truth of creation which must be acknowledged, or a plan of God for life which must be respected.”<sup>66</sup> The lack of peace, Pope John Paul II argued, was not just due to regional conflicts, abortion, poverty, and the like, but also due to plundering nature’s resources.<sup>67</sup> Similar to other social problems, the ecological crisis is a moral issue reflecting a disharmonious relationship between humanity and God. John Paul II warned, “If man is not at peace with God, then earth itself cannot be at peace.”<sup>68</sup>

### *Conclusion*

This survey attempts to outline the essential dimensions of the modern-day ecological crisis—scientific, political, economic, social and religious. While there is much more that could be discussed in each of these respective areas, for our purposes here, it goes to demonstrate the complexity of the ecological crisis and the need for individuals and communities to reach across disciplines and institutions in order to fully and effectively deal with these various concerns. When it comes to the environment, we have seen scientists who do not adopt traditional theistic worldviews speak of the need for caring for the planet with a vision of the sacred. In the early 1990s, a group of scientists including Stephen

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<sup>65</sup> Pope Francis and Patriarch Bartholomew, “Common Declaration of Pope Francis and the Ecumenical Patriarch Bartholomew I,” accessed October 11, 2016, [https://w2.vatican.va/content/francesco/en/speeches/2014/may/documents/papa-francesco\\_20140525\\_terra-santa-dichiarazione-congiunta.pdf](https://w2.vatican.va/content/francesco/en/speeches/2014/may/documents/papa-francesco_20140525_terra-santa-dichiarazione-congiunta.pdf).

<sup>66</sup> Pope John Paul II, *Evangelium Vitae*, accessed March 26, 2016, [http://w2.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf\\_jp-ii\\_enc\\_25031995\\_evangelium-vitae.pdf](http://w2.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_25031995_evangelium-vitae.pdf).

<sup>67</sup> Pope John Paul II, “World Day of Peace Message 1990,” accessed March 25, 2016, [https://w2.vatican.va/content/john-paul-ii/en/messages/peace/documents/hf\\_jp-ii\\_mes\\_19891208\\_xxiii-world-day-for-peace.pdf](https://w2.vatican.va/content/john-paul-ii/en/messages/peace/documents/hf_jp-ii_mes_19891208_xxiii-world-day-for-peace.pdf).

<sup>68</sup> *Ibid.*

Jay Gould, Hans Bethe, Stephen Schneider, and Carl Sagan issued a statement which contained the following sentiment: “As scientists, many of us have had profound personal experiences of awe and reverence before the universe. We understand that what is regarded as sacred is more likely to be treated with care and respect. Our planetary home should be so regarded. Efforts to safeguard and cherish the environment should be infused with a vision of the sacred.”<sup>69</sup>

Likewise, we have seen religious leaders, for example Pope Francis, who have consulted with and enlisted the assistance of credible scientists to provide the evidence to buttress moral and religious teachings regarding care for creation. Though different disciplines have their individual aims, when it comes to environmental concerns, deep similarities in thought patterns could be discovered that would contribute to devising common projects for the sake of human and environmental well-being. Because of the urgency and scope of the issues, it would serve humanity and the ecology well if communities and institutions began to see more convergences rather than conflicts that prove counterproductive to the overall goal that each is trying to achieve.

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<sup>69</sup> Quoted in C. L. Harper, “Religion and the Environment,” *Journal of Religion and Society*, Supplement Series (2008): 20.