

The Global Sustainability Challenge

The Global Sustainability Challenge

Edited by

Gerard Magill and James Benedict

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We dedicate this book to Duquesne University in tribute to the Endowed Annual Conference Series on the Integrity of Creation.

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INTRODUCTION

GERARD MAGILL

In 2015, the President of Duquesne University in Pittsburgh in the United States (Charles J. Dougherty) commissioned an endowed annual academic conference series on the *Integrity of Creation* to celebrate the organization's Spiritan mission. The University is Catholic, being founded by members of the Congregation of the Holy Spirit, the Spiritans.¹ The current University President, Ken Gormley, continues to provide outstanding support for the conference, inspiring excellence as the series develops.

This conference series addresses emerging concerns and pivotal problems about our planet's environment and ecology, including this study of the *Global Sustainability Challenge* that earth faces. Each conference is an interdisciplinary endeavor in the sense that presenters and participants from different disciplines are invited to engage each other in civil discourse on the selected topic. The conference has three goals: to provide a scholarly opportunity to engage with established and emerging research; to foster interdisciplinary discourse; and, to enlighten public awareness and discussion on the selected issues.

In Fall 2015, the topic of the inaugural conference was *Climate Change* as an urgent concern regarding the Integrity of Creation.² Before the conference occurred, there was the publication in May 2015 of the environmental encyclical of Pope Francis, *Laudato Si': Praise Be To You. On Care for Our Common Home*.³ The Pope invited "every person living on this planet," "all people of good will," "to enter into dialogue with all people about our common home" as "a shared inheritance."⁴ The call of Pope Francis to foster a "respect for the Integrity of Creation" is very similar to the focus of the Spiritan mission.⁵ The second annual conference and its proceedings focused on the topic of *Integral Ecology: Protecting our Common Home*,⁶ the conference title being inspired by a chapter in the encyclical of Pope Francis.⁷ The third annual conference and its proceedings focused on the topic of *The Global Water Crisis*,⁸ again inspired by the encyclical of Pope Francis.⁹ The focus of the fourth annual conference and its proceedings appears in the title of this book, *The*

Global Sustainability Challenge, reflecting the recognition of the Earth Charter by Pope Francis in his encyclical.¹⁰

As this conference series evolves, many other topics will be discussed to shed light on the *Integrity of Creation* from multiple perspectives. To safeguard our planet, we must be attentive to environmental concerns with air pollution, problems that arise from toxicity in the land and ocean regarding food sources and biodiversity, and many other crises, not least of which is how to anticipate the movement of vast populations from coastal regions that may become permanently flooded. These topics all highlight the basic problem of global sustainability.

The presentations at the conferences result from a peer-reviewed process for inclusion at the conference and in these published proceedings. The book chapters reflect the conference presentations and have been written to appeal to a general audience with rigorous scholarship, depicting the interdisciplinary focus of the discussions. The chapters are organized into several disciplines and categories that relate together in an integral manner. Each section is designed to present a wide variety of standpoints: context, science & philosophy, ethics, religion, global issues, and finally generational perspectives.

The first section sets the *context* for the discussion on the Global Sustainability Challenge with a Leadership Address by the Prime Minister of the Commonwealth of Dominica, Roosevelt Skerrit. This section also provides an overview of the various arguments, indicating an overlapping and cumulative sense of urgency about the Global Sustainability Challenge. The section on *science and philosophy* discusses the relation between water, refugees, and geophysics, highlights the problem of global sustainability in the Anthropocene, and explains why the liberal arts and the environment need to be sustained. The section on *ethics* considers the margins of sustainability from a variety of religious perspectives and explores environmental ethics from the standpoint of Confucian values. The next section on *religion* indicates the need for a dialogue of action (through media) among religions to combat ecological problems and engages the focus on environmental stewardship in the encyclical of Pope Francis, *Laudato Si'*. The subsequent section on *global issues* deals with crucial concerns regarding sustainability in West Africa and in Paraguay. Finally, there is a longer section on *generational perspectives* that introduces a variety of voices of students whose future faces an existential crisis, bearing the brunt of sustainability compromises across previous generations. The brief *conclusion* describes the Global Sustainability Challenge as an urgent ethical imperative.

A few words of acknowledgment are appropriate to recognize the contribution of many in planning the annual conference series that has led to this collection of conference proceedings. Above all, the establishment of an endowment by President Charles J. Dougherty at Duquesne University to support this annual academic conference series presents a lovely legacy. Also, there is sincere appreciation for the continuing support of Ken Gormley as our current University President and for the ongoing support of the Spiritan Congregation that sponsors the University. The editors are very grateful for the meticulous work of a highly dedicated Conference Planning Committee, an outstanding University librarian, Ted Bergfelt, and superb support staff, including a very gifted group of international graduate students. Finally, the extraordinary grace and talent of the conference coordinator, Glory Smith, deserves to be recognized with high acclaim and heartfelt gratitude: this outstanding commitment, in addition to all of her other daily office duties, continues to be a labor of love that assures success and joy at each conference.

Notes

¹ See, <http://www.duq.edu/about/mission-and-identity>; also see, <http://www.spiritans.org>.

² See the conference proceedings, Gerard Magill, Kia Aramesh, eds., *The Urgency of Climate Change* (Newcastle Upon Tyne, UK: Cambridge Scholars Publishing, 2017), Introduction, xi-xiv. Permission has been provided to reiterate in the Introduction of this book materials from the Introduction to the first book in this series, *The Urgency of Climate Change*.

³ Pope Francis, *Laudato Si': Praise Be To You. Encyclical Letter of the Holy Father Francis on Care for Our Common Home* (Vatican City: Libreria Editrice Vaticana, 2015).

⁴ Pope Francis, *Laudato Si'*, no. 3, 28, 93.

⁵ Pope Francis, *Laudato Si'*, no. 130.

⁶ See the conference proceedings, Gerard Magill, Jordan Potter, eds., *Integral Ecology: Protecting Our Common Home* (Newcastle Upon Tyne, UK: Cambridge Scholars Publishing, 2018).

⁷ Pope Francis, *Laudato Si'*, no. 124 (in chapter three), and chapter four.

⁸ See the conference proceedings, Gerard Magill, James Benedict, eds., *Cascading Challenges in the Global Water Crisis* (Newcastle Upon Tyne, UK: Cambridge Scholars Publishing, 2019).

⁹ Pope Francis, *Laudato Si'*, chapter 1, section II, "The Issue of Water," no. 27-31.

¹⁰ Pope Francis, *Laudato Si'*, no. 207, refers to the *Earth Charter* for a sustainable, global society that emphasizes justice and peace (The Hague, 29 June 2000, at <https://earthcharter.org/discover/what-is-the-earth-charter>).

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I. CONTEXT

CHAPTER ONE

LEADERSHIP ADDRESS¹ BUILDING CLIMATE RESILIENT COUNTRIES

ROOSEVELT SKERRIT

PRIME MINISTER AND MINISTER FOR FINANCE, INVESTMENTS,
HOUSING AND LANDS OF THE COMMONWEALTH OF DOMINICA

It is my great pleasure and honor to be associated with this institution, not only as a devout Catholic but also to be considered worthy to become an alumnus of this illustrious Duquesne University which incidentally is the only Spiritan institution of higher education in the world with a phenomenal record of public service over the last century. In this regard, I thank President Gormley, the administrators and members of the Integrity of Creation Committee and the Reverend Fathers of this university, for inviting me here and for bestowing on me this Honorary Doctorate of Humane Letters. This has, as a consequence, given me an opportunity to speak to you, as I continue my fight to effect positive change and immediate response to climate change around the world.

Distinguished ladies and gentlemen, it is indeed befitting that I should stand before you within the halls of the first university in Pennsylvania that has received the Environmental Protection Agency's Energy Star Combined Heat and Power Award for its natural gas turbine located on campus. Duquesne has steadfastly shown its commitment to protecting our fragile environment, with its continued support of environmentally-friendly initiatives, such as its innovative ice cooling system which cools buildings and reduces peak energy demand, helping to protect the ozone and reducing the greenhouse effect. It pleases me that in recognizing this, the University is also giving high regard to environmental conservation through Duquesne's Centre for Environmental Research Education (CERE), which offers undergraduate and graduate degree programs in environmental science and management, along with the specialized MBA with a focus on sustainability.

The biodiversity of our environment is our duty and responsibility. It has provided our sustenance throughout the centuries and must, therefore, be preserved and maintained, not only for our posterity but for that of future generations. And, therefore, on this occasion, I want to say a heartfelt “Thank you” to all of you at Duquesne University for doing your part to ensure that humanity has a fighting chance of survival.

Ladies and gentlemen, I speak to you today not as a harbinger of bad news or a cynic but as someone who has experienced firsthand the devastatingly cruel and merciless effects of climate change and global warming. More and more experts are warning of the danger of losing our planet as weather patterns change and shift. For those who view my island home, the Commonwealth of Dominica, as located in a region thousands of miles away and therefore somewhat removed, I invite you to join me in recounting, here in the United States, the wrath of Category 4 Hurricane Harvey, as it ravaged Texas in August of 2017, leaving in its path 106 confirmed deaths and damages estimated at US \$125 billion. This placed it among the costliest natural disasters ever in the United States, comparable to Hurricane Katrina of 2005. Just last week, Hurricane Michael, another Category 4 hurricane, devastated beyond recognition areas of Florida and an already fragile coast of the Carolinas, with the death toll as of Saturday of 18, according to Reuters and the New York Times.

Distinguished ladies and gentlemen, it has, therefore, become painfully obvious that such disasters are no longer relegated to the islands of the Caribbean or Pacific regions, and that we are all susceptible to the intensity of these calamitous occurrences, whether they be in the form of wind and rain or earthquakes or other formerly natural phenomena. When Category 5 Hurricane Maria made landfall in Dominica on September 17, 2018, it felt like all the demons from all over the world had been gathered up and flung at us at 175 miles per hour. Maria followed closely on the heels of Irma, one of the biggest hurricanes to make landfall on record in the Caribbean. In the space of just two weeks, two Category 5 hurricanes—a more than once-in-a-thousand-year event—shook the world into confronting our planet’s changing climate, like no disaster had done before.

For many years, those of us warning about floods and droughts, of rising sea levels and submerging countries, felt like we were shouting alone in the dark. After Maria and Irma, climate change was thrust out of the shadows into the light; away from theoretical construct into lived reality; pulled from some distant future straight into the present. We must not let this moment slip away. We must not let those memories slip into the night.

Leading scientific experts explain the scale of this disaster was a direct result of the warming of the Atlantic Ocean. Hurricanes and tropical storms pick up more water than before as they cross the Atlantic, which in turn they drop with devastating consequences when they make landfall. Dominica has witnessed a dramatic escalation of storm damage in recent years. The recently released report by the Inter-Governmental Panel on Climate Change (IPCC) recorded that, “Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are expected to increase with global warming (and that any such increase) is projected to affect human health, with primarily negative consequences.”²

A few days after Maria struck, the Government of the Commonwealth of Dominica declared its intention to be the first climate-resilient nation in the world. Some observers may say we have overreached ourselves, that Dominica’s intention to be the world’s first climate-resilient nation is overly ambitious. We beg to differ! We believe there is no alternative. Dominica’s vision is an integrated set of specific, practical, time-bound targets that we believe are achievable with resources that have been committed.

As explained in the IPCC report, “Climate change impact and responses are closely linked to sustainable development, which balances social well-being, economic prosperity, and environmental protection.” That principle was adopted in 2015 by the United Nations as Sustainable Development Goals (SDGs) to “provide an established framework for assessing links between global warming ... and development goals that include poverty eradication, reducing inequalities, and climate action.”³

Dominica is a natural candidate to demonstrate that a new, more sustainable developmental trajectory can be achieved. We are small enough that climate resiliency is within our reach in a relatively short period of time. Larger countries would find this much harder to do. Yet Dominica is also a sovereign nation, with all the complications, advantages and challenges that brings. Rearranging entire systems of education and health to support resiliency is complex. Reorganizing systems of ports, bridges and roads is expensive. Resetting the relationship between private and public sectors has wider implications. Employing the rule of law and maintaining social order must be carefully done. Transforming decades-old ways of doing things, by consensus, complex coordination, with transparency and sensitivity to all stakeholders is not easy. But we cannot evacuate everyone and abandon ship in the event of a catastrophe, so resilient we must become!

We believe that building a resilient nation is about more than just strengthening systems and climate-proofing public infrastructure. It will call for us to adopt a particular moral character. A resilient nation embraces full respect for the needs of all its citizens and communities-economic, social, political and spiritual. Our challenge, therefore, is not simply one of physical renewal, but of social regeneration.

We are reminded by the IPCC report that “International cooperation is a critical enabler for developing countries and vulnerable regions to strengthen their action for the implementation of ... climate responses, including through enhancing access to finance, taking into account national and local circumstances and needs.”⁴ Hence, it continued, “... adaptation and mitigation options to global warming ... implemented in a participatory and integrated manner, can enable rapid, systemic transitions in urban and rural areas ... These are most effective when aligned with economic and sustainable development, and when local and regional governments and decision makers are supported.”⁵ In this regard, the international community has been inspired by Dominica’s goal and the conviction of its leadership. It has so far been supportive of our efforts to deliver on this vision and the example that Dominica can potentially set for the world.

We believe that with what has so far been pledged, if those pledges are honored within the time frame set, in combination with our own limited national resources, it is possible for Dominica to be meaningfully climate-resilient in five years. Today I submit to you that it is only with this type of global cooperation and perspective that we as a world, and humanity as a whole, will tackle climate change efficiently and effectively. In this regard, there is no time to wait! We are committed to following our well-thought-out plan which will soon be ratified by the Government.

To be clear, ladies and gentlemen, striving for a climate-resilient nation is an overarching approach to national development, which makes society and the economy sustainable, protects our natural and built habitats, and generates inclusive growth that (as far as it is humanly possible to ensure) is not altered, reversed or undone by climate change. We recognize that loss and damage as a percent of GDP from extreme climate events are correlated with levels of economic development and equality. We witnessed the correlation in the Caribbean through markedly different effects the same climate events had on neighboring countries with different levels of development: the Cayman Islands versus Grenada following Hurricane Ivan in 2004 or Puerto Rico versus Florida following the 2017 hurricane season.

A blueprint for achieving climate resilience cannot be independent of a plan for long-term socio-economic development. Our plan is based on our lived experience. We reviewed each of Dominica's actions in the aftermath of Hurricane Maria. In developing this plan we posed the question, "What would Dominica have to have had in place before a climate disaster to ensure that they would not have to repeat the same action next time around?"

We recognize that there is danger in fighting the last fire. The next climate-related disaster may be different. Consequently, the result of this exercise was to identify the broad characteristics of a disaster-resilient nation, with practical objectives that would allow those characteristics to be acquired within five years and within a budget.

The first objective of resiliency is that citizens must have an early resumption of essential services such as electricity, water, telecommunications, health care, security, access to food and payments. Undergrounding utility lines in built-up areas is one example of what can be done to help achieve this goal. Those who cannot be reconnected quickly will be encouraged and helped to live at a higher level of self-sufficiency.

The second objective is that during a climate disaster, all citizens must have safe shelter. And in the aftermath of the disaster, all citizens must have access to essential supplies of food, water, energy and medicines for the length of time it would take before ready supplies are available once more. More public shelters, better-built private homes, public and private food, and medicine stores and back-up energy will contribute to achieving this objective. No one can be left behind. Every human being matters and is deserving of dignity and an acceptable form of shelter.

The third objective is that the flow of national income does not hit a sudden stop after a natural disaster. One example of this is our ongoing efforts in geothermal development that allows for exporting geothermally-generated electricity undersea to Guadeloupe and Martinique, with a hurricane clause that pays out a higher income when a natural disaster has hit Dominica. Other examples include a greater export of individual professional services down a resilient high-speed internet connection and more resilient agriculture and tourism.

These three objectives of our plan will be able to function independently of each other but will also draw strength from each other. There is a need for overarching frameworks for the role of law in climate resiliency, the roles of institutions, the roles of national disaster protocols, the relationship between public and private sectors before, during and after a

disaster, and the importance of national conversations, engagement, and consultation.

We believe that when the final reckoning comes, the Master Counter will look past our masks and add up what we did, not what we said; what efforts we made to bring sanctuary to our neighbor and what efforts we have all made to end climate change globally. I reiterate today that climate change is no longer an abstract euphemism pertaining only to small islands in the Caribbean or Pacific regions. Events of the past 36 months have brought this home forcibly to us all. Every single one of us has a stake and must, therefore, raise a voice in the promotion of the concept of reducing exposure to such. I ask that you, too, clear your throats and let your voices be heard!

We call on you to join us on this journey to build a climate-resilient future. Let us march toward the sunlit uplands together, hand in hand, shoulder to shoulder.

Again, I am humbled by your inviting me here today. I invoke God's continued blessings on this institution, and all associated with its wonderful work here in Pennsylvania and the world over. You have done a remarkable job at helping to make Mother Earth a better place for all mankind. I thank you.

Notes

¹ Address on the occasion of the Conferral of an Honorary Doctor of Humane Letters *Honoris Causa*, by Duquesne University, October 16, 2018.

² Intergovernmental Panel on Climate Change, "Global Warming of 1.5 Degrees Celsius" (2018), retrieved at, https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

³ Ibid.

⁴ Ibid.

⁵ Ibid.

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CHAPTER TWO

PIVOTAL PERSPECTIVES ON THE GLOBAL SUSTAINABILITY CHALLENGE

GERARD MAGILL

Introduction

This book was completed in the context of several significant events. First, the *2019 Arctic Report Card* tracked the increasing concerns related to Climate Change globally. This influential report represents peer-reviewed environmental analyses compiled by 81 scientists from 12 nations.¹ Second, the United Nations annual Climate Change conference (referred to as COP 25) occurred in December 2019 in Spain. There were 27,000 delegates and the event was the longest on record to address the escalating crises that are emerging.² These events continue to work alongside the pivotal Sustainable Development Goals adopted by the United Nations Development Programme in 2015.³ Third, the spread of the coronavirus (Covid-19) across the globe caused an astonishing number of deaths. The pandemic presented a sudden and terrifying reminder of the fragility of human sustainability in this vulnerable environment of planet earth.

In the context of these events, the book presents the proceedings of the 4th annual endowed conference on the Integrity of Creation, fostering the wholeness of creation from interdisciplinary perspectives. This 4th annual conference selected the topic of the *Global Sustainability Challenge*. The perspectives in the study represent a variety of disciplines that engage each other in an integrative way. The chapters have been organized to let the dialogue unfold in an overlapping manner, with points of view developing from different angles.⁴ The sections below summarize crucial standpoints as we seek to protect our common home. As mentioned in the book's Introduction, there are several main sections to bring coherence to the contributions. The first section introduces the context of the book and the subsequent sections present different standpoints on science and philosophy, ethics, religion, global issues, and generational perspectives.

Context

This opening chapter provides an overview of the multi-disciplinary perspectives regarding the Global Sustainability Challenge that appear in the book (using the abstracts submitted by the various contributors).⁵ This overview is designed to assist readers in keeping an eye on the big picture as they explore the various topics. The first section of the book on context presents a leadership address by the Prime Minister of the Commonwealth of Dominica, Roosevelt Skerrit, on building climate-resilient countries. This section also highlights interdisciplinary character of the subsequent sections. As the chapters develop, there is a cumulative sense of Global Sustainability as a function of the common good belonging to all and meant for all (adopting a phrase from the Papal encyclical, *Laudato Si'*).⁶

Science and Philosophy

Within this context, the contributions on science and philosophy consider several related topics. The first topic discusses an increasingly urgent issue that focuses on water, refugees, and geophysics. The purpose is to explain how humanitarian water problems indicate complex problems that impact everyone. 85% of the world's refugee population is located in developing countries, with most of these countries suffering water scarcities. Where and when surface water is not available, groundwater is usually the only alternative. The analysis highlights some of the harshest places on the planet in search of good quality drinking water for refugees and internally displaced persons. The goal is to show how the failure to provide healthful drinking water in a refugee camp in the Turkana desert, for instance, becomes a community health problem in Western countries. Recent interpretations of geophysical data acquired from satellites in space indicate that water and consequent food scarcities observed in remote refugee camps in distant nations will become "our" destiny unless global groundwater management practices are changed.

The second topic focuses on global sustainability in the Anthropocene, suggesting crucial roles that universities can have. The Anthropocene is the time-period in which human and social impacts on nature are disrupting fundamental natural cycles including the hydrological, carbon, nitrogen, and phosphorus cycles. Not only is this a discontinuity in human-nature relations from millions of years of evolutionary history, but it also signifies a reversal of cause and effects. Humans and their activities are the primary cause of disrupting natural processes. Sustainable development has been proposed as a solution to the eco-social challenges

of the Anthropocene. The chapter explores the meaning of global sustainability in this context, the possibilities of achieving it, and how educational institutions can play a constructive role in this process.

The third topic continues this educational theme by considering why the liberal arts and the environment need to be sustained together. To be able to debate properly about the urgent issues facing our planet today, we must take seriously educational first principles in the liberal arts. We must remember that they are not “trivial” in the sense of being insignificant, but rather “trivial” in the historical sense of being foundational to our ability to dialogue and think properly, including about climate change and environmental sustainability. To sustain our planet, the analysis delves into how we are failing to properly think about the liberal arts and environmental sustainability together, and why in the end we must realize that they can only be thought properly when they are thought through each other.

Ethics

These perspectives provide a robust basis for discussing issues in ethics and in religion that impact global sustainability. First, it can be helpful to think at the margins of sustainability in religious ethics. The sustainability movement has always been influenced by religious ethics. Several significant contributions of religious ethics to sustainability are relatively unexplored. On the one hand, ethical principles that resonate with multiple religious traditions can be used to evaluate and improve quantitative methods of assessing sustainability policies. This can be considered in relation to distributive environmental injustices. On the other hand, injustices also encompass the emotional harms of environmental degradation, thereby eliciting a discussion of the ways that the guilt and shame of perpetrators can hinder sustainability efforts. Finally, the analysis explains that religious ritual can respond to these emotions and enhance sustainability initiatives.

Another point of view deals with relating environmental ethics to Confucian values. Confucianism has something to offer in shaping an environmental viewpoint. The revival of Confucianism and the interest in creating an “ecological civilization” is a counterpoint to ongoing ecological devastation. The contributions of Confucianism to ecological civilization involve relationality and nature, the morality of nature, and humane government and nature. Each of these fosters reflection on how humans complete the great triad of Cosmos, Earth and Human. We are not

simply social beings but rather are ecological and cosmological beings. This realization is the basis for a genuine ecological civilization.

Religion

The next two chapters continue this focus on the contribution of religion. First, to engage ecological sustainability, there is a call for what can be described as a dialogue of action through the media among religions. This chapter highlights that human ecology is deeply conditioned by beliefs about our nature and destiny—that is, by religion. Despite the impact of secularism today, religious beliefs still significantly impact people's attitude toward the environment. It is, therefore, critical to engage and actively invoke religions as active partners in campaigns for ecological preservation and sustainability. The chapter highlights how religions can be either constructive or destructive toward projects of ecological sustainability. The analysis advocates for the use of different forms of media toward an effective dialogue of action between religions for the common good of preserving our environment.

Second, a fruitful blending of religious faith and environmental naturalism can be traced in the encyclical *Laudato Si'* of Jorge Mario Bergoglio, Pope Francis. There is a need to situate the environmentally constructive message of Pope Francis within the broader Judeo-Christian tradition. Locating *Laudato Si'* within the historical progression of discourse on Catholic stewardship can yield inspiring environmental and theological insights for the current age.

Global Issues

The next section of the book engages global issues that have an extensive impact on global sustainability. One chapter explores the challenging issue of developing a sustainable and ethical electronic waste (e-waste) management in Agbogbloshie, Ghana in West Africa. Millions of tons of e-waste are produced yearly by developed countries, with China and the United States leading the way. With rising economies in Asia, Latin America, and Eastern Europe, the quantity of e-waste generated around the globe is expected to increase largely as a consequence of the introduction of new products that have a shorter electronic lifespan. It has been estimated that the current global annual e-waste production exceeds 40 million tons, accompanied by an annual growth rate of 4 to 5 percent. Yet, there is a lack of an efficient, safe and sustainable infrastructure for the disposal of e-waste across world. The Agbogbloshie e-waste crisis has

generated environmental, economic, health, social, and eco-ethical issues that pose a pervasive challenge to sustainability. The analysis considers a possible approach to e-waste recycling methodology for West Africa.

The next chapter presents the personal narrative of a Catholic Bishop's ministry around sustainability in Paraguay to understand and love a land and its people. His journey extends back thirty years when he was preparing to go to Paraguay, doing some research on the local mythology and culture. He encountered the theme of the "Land-Without-Evil" as central in the Guaraní culture. It had and, to a certain extent, still has a great impact on perceptions about Paraguay. His account is about a land where creation is restored, and social interaction is renewed. The utopian vision of this landscape had to be checked by social reality that has changed enormously over past decades. This narrative account shares personal experience of discovery, bumpy learning, and struggle with myth and the reality in this story of sustainability.

Generational Perspectives

The final section of the book presents different generational perspectives about sustainability articulated by high school students who must grapple with the myriad of problems that they have inherited. The voices of these students are crucial for ongoing discourse on global sustainability. Each of these chapters was presented as a separate poster at the conference on the Global Sustainability Challenge whose proceedings appear in this book. The topics range across disparate issues, including perspectives in global agriculture, thorium as a possible energy resource, and the economic challenge of building modern sports stadiums, to a connected set of discussions on the meaning of being human, the meaning of being poor, and the role of charity in a globalized world.

Notes

¹ See, *2019 Arctic Report Card*, at, <https://earthsky.org/earth/2019-arctic-report-card-visual-highlights-video>.

² See, United Nations, *Climate Change*, at <https://unfccc.int/event/cop-25>.

³ See, United Nations Development Programme, *Sustainable Development Goals* (2015), at, <https://www.undp.org/content/undp/en/home/sustainable-development-goals.html>.

⁴ The organization of this chapter adopts the same approach as previous books in this annual series of conference proceedings.

⁵ This discussion reflects the chapters in this book that constitute the proceedings of the conference on the Global Sustainability Challenge in Fall 2018.

⁶ Pope Francis, *Laudato Si': Praise Be To You. Encyclical Letter of the Holy Father Francis on Care for Our Common Home* (Vatican City: Libreria Editrice Vaticana, 2015), §23.

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II. SCIENCE & PHILOSOPHY

CHAPTER THREE

WATER, REFUGEES, AND GEOPHYSICS: ARE HUMANITARIAN PROBLEMS OUR PROBLEMS?

PAUL BAUMAN

On September 26, 2018, I gave the closing talk at the conference on The Global Sustainability Challenge at Duquesne University. The talk was titled “Water, Refugees, and Geophysics—Are Humanitarian Water Problems *Our* Water Problems?” The talk, largely composed of photographs and a few graphs, was almost completely void of bullet points. The presentation traveled in time and space to some of the most desperate places on the planet where I have had the privilege to work. These usually remote areas, districts or countries all had one thing in common—they were facing a water crisis. As a hydrogeologist and exploration geophysicist, finding significant quantities of drinking water beneath the surface of the earth is my specialty. Consequently, I have worked in such places as the decimated post-tsunami Aceh Province in Indonesia, desert areas of Yemen, refugee camps in East Africa, drought-affected areas of Malawi, war-ravaged districts of Northern Uganda, and the recently established Rohingya refugee camps in Bangladesh.

In the above situations, shelter, security, food, and water are the minimum essentials that people need to survive, at least in the short and medium term. Exploration geophysics involves finding this fourth necessity. This is often especially difficult as the lack of water may be precisely why a government gave up a particular area for a refugee camp in the first place. Or, perhaps it was the lack of water that contributed to the conditions which led to episodes of civil war or ethnic cleansing.

While these humanitarian catastrophes are occurring at the far ends of the earth, it is too easy to think of these problems as *their* problems. Among these conditions contributing to these catastrophes are drought, declining water tables, salinization of water supplies through saltwater