

CARING FOR OUR
COMMON FUTURE BY

Protecting the Earth



Religions for Peace

Religions for Peace is the largest international coalition bringing together representatives of the world's religious communities who are dedicated to achieving peace. It is a non-sectarian, non-political international organization that is accredited to the United Nations. *Religions for Peace* has national and regional affiliates in 90 countries and Women of Faith and Interfaith Youth Networks at the global, regional, and national levels. It takes an inter-religious approach to mobilizing the tremendous potential of religious communities, emphasizing how collaboration and coordination among faith groups enhances their overall impact and ability to contribute to peace and development.

Religions for Peace

777 United Nations Plaza
New York, NY 10017
United States of America
Website: www.rfp.org

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GreenFaith, Gary Gardner

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Executive Summary

This moment in human history is unprecedented. Industrial economies are impacting our planet so extensively that geologists are considering designating a new geological epoch named for humans: the Anthropocene. For people of belief, this possibility calls for deep reflection on humanity's place in Creation. What other species can impact its nest so massively, in such a geologically short period of time?

THE CHALLENGE

The sustainability crisis consists of dozens of interconnected environmental, social, and economic issues. Ecological Footprint (EF) analysis demonstrates that industrial development, characterized by use of fossil fuel energy and high levels of waste, is not viable in the long term. It shows that humanity's demand for nature's goods and services is much greater than nature can supply—about 70 percent greater, in fact. The excess demand is met by drawing down nature's reserves: using groundwater, forests, and topsoil, for example, faster than they can be regenerated. These practices cannot continue indefinitely, because reserves are finite. Overuse of resources is now evident across a number of environmental sectors:



Climate change

Our planet is warming at unnatural rates. Sea levels are rising, storms are more frequent and intense, and oceans are increasingly acidic as they absorb more carbon dioxide. The world's nations agreed in 2015 to limit global emissions and cap global average temperature at no more than 2 degrees Celsius above preindustrial levels, with 1.5 degrees a much-preferred target. This could require that emissions peak by 2020, then be cut in half each decade thereafter.

Because societies have been slow to cut emissions, some scientists and interest groups now call for using “geoengineering” to limit temperature rise. The strategies proposed involve risks that could be monumental for the planet. The question is whether the human family will finally commit to the hard work of emissions reductions or resort to risky geoengineering options.



Air pollution

The World Health Organization (WHO) reports that 90 percent of people worldwide breathe air containing high levels of pollutants, and that around seven million people worldwide die each year from polluted outdoor and indoor air. The problem varies by development level: in low- and middle-income countries, 97 percent of cities of 100,000 people or more do not meet WHO air quality guidelines, compared to 49 percent in wealthy countries.



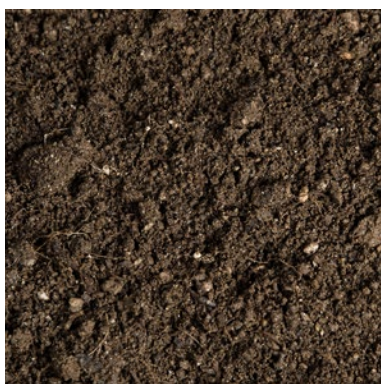
Water scarcity

Water supply is fixed, but demand grows with expanding populations and economies, and supplies are disrupted by a changing climate. Some 36 percent of the world's population lives in water-scarce regions, and the share could reach 50 percent by 2050. Meanwhile, 20 percent of the world's groundwater deposits are pumped faster than they can be recharged by rainfall, meaning that groundwater levels are falling. Loss of irrigation—the controlled application of water to crops—could mean large losses of food: irrigation is used on only 16 percent of arable land worldwide, but it delivers 44 percent of global crop production.



Deforestation

Deforestation is a serious problem in some regions, although the global rate of forest loss is slowing. The 2015 forestry assessment from the UN's Food and Agriculture Organization (FAO) reports that an area the size of Peru was deforested globally between 1990 and 2015.



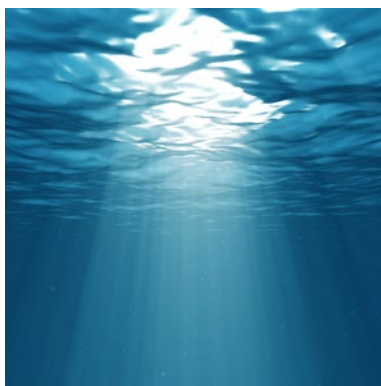
Soil degradation

Soil health is declining on all continents, which affects a wide range of associated issues, from food supply to water availability to climate change. Studies in the 1990s and 2000s suggested that some 15 to 24 percent of land globally has suffered physical damage (e.g., erosion) or chemical damage (salt loading) at levels that reduce productivity. Soil degradation unfolds even as the demand for food continues to increase. One out of nine of the human family is chronically hungry today, and hunger at the global level is increasing. Yet demand for food is forecast to increase by 50 percent between 2013 and 2050.



Biodiversity loss

Many biologists assert that a mass extinction is underway, the sixth in the history of Earth, and the first caused by humans. Species are disappearing at many times the natural rate: the International Union for the Conservation of Nature reports that 25 percent of mammal species; 13 percent of bird species, and 41 percent of amphibian species are threatened with extinction. The number of threatened mammals, birds, and amphibian species is up by double-digit percentages since 1996/1998.



Ocean degradation

The world's oceans are overexploited and degraded at levels not seen in millions of years. Some 33 percent of marine fisheries are fished beyond sustainable levels, up from 10 percent in 1974. Oceans are acidifying and coral reefs, rich in biodiversity, are in serious decline.

A RELIGIOUS-SPIRITUAL RESPONSE

People of faith possess a broad set of spiritual, financial, infrastructural, political, and social assets that could, conceivably, help create sustainable communities and economies. These include a large number of adherents who meet regularly and form deep relational ties; physical assets such as land and buildings; meaningful amounts of investment capital; and, most powerfully, moral teaching and spiritual tools such as prayer, song, and liturgical practices. Of course, religious and spiritual traditions exist for reasons deeper than creating societal change. But the interests of people of belief and advocates of sustainability arguably align closely on a range of issues. For this reason, believers in many traditions are exploring how sustainable policies, practices, and lifestyles might fit comfortably within their tradition.

To maximize effectiveness and societal impact, faith and spiritual traditions can tap their existing local, regional, national, and global structures. These structures can increase impact by organizing to operate efficiently, in two ways. First, they can coordinate their units at various hierarchical levels to operate effectively. Actions loop around and through each of the levels in ways that are reciprocal and reinforcing. In this way, the various levels learn from one another and avoid duplication of effort. Second, each tradition can act in concert with communities of other traditions, eliminating duplicated effort. Multi-religious cooperation softens discord among faith or spiritual traditions and highlights complementary strengths.

In addition, religious and spiritual traditions can form partnerships with other, often non-religious, entities to drive social change. Engaging with a diverse set of partners increases effectiveness, broadens one's perspective, and strengthens the web of enduring civic relationships. For the modern environmental sustainability movement, potential partners for faith and spirituality communities are usually easy to identify. Local- and national-level environmental, conservation, animal advocacy, and sustainability groups often welcome collaboration with people of belief, offering entrée to existing programs. For their part, communities of believers bring to partnerships any of the wide range of assets identified earlier, as well as intangible strengths such as commitment and credibility.

The effort to build sustainable economies requires a massive shift in economies worldwide. This is a task of civil society, as well as government and business. Faith and spiritual traditions have unique and powerful contributions to make to this effort. Their clear and committed voices are urgently needed.

Introduction

In 2016, an international working group of geologists recommended that a new geological epoch, the Anthropocene, be formally added to the geological record of time. Their reasoning: artifacts of human activity—including plastic, aluminum, and the ash from fossil fuel burning—are now embedded in sediments all over our planet. Because geologists are the scientists who define the epochs, eras, and eons that make up Earth's calendar, the recommendation was newsworthy.

It was also sobering. For people of belief in particular, the call to recognize the first human-driven epoch is cause for deep reflection on humanity's place in Creation. On one hand, the vote is a tip of the hat to the vastness and range of human power. No other species is as skilled at building its nest as we humans. When we act as conscious, spirit-filled creators, building with an eye to the common good, we do terrific work. At the same time, the vote surely demands of us humility and soul-searching. What other species would soil its home, on a planetary scale, in the geological equivalent of a blink of an eye?

The environmental and social damage created by industrial development has given rise to a values-driven corrective known as sustainable development. While sustainability headlines focus on technologies such as solar panels or policies like the Paris Agreement on climate, the heart of sustainability is a shift in values that reveals a new worldview and a new understanding of progress. In the sustainability vision, the natural environment is protected and nurtured as the foundation of all economic activity, while human well-being and equality are central to economic design. Indeed, citizens and policymakers in a sustainable society would recoil at economies that treat waste, excess, environmental decline, and mass poverty as the unavoidable price of progress.

The moral foundation of sustainable development creates an exciting opening for religious and spiritual communities at this moment in history. People of faith and spirituality, fluent in the language of values, bring a unique and indispensable voice to the sustainability movement that complements scientific arguments. Secular critics rightly decry the waste of resources in a consumer society, but people of belief offer a robust additional critique: that materialism and its cousins, greed and selfishness, are destructive of the human spirit and degrade our capacity to *love*. Or consider the believers' testament to the intrinsic worth of the natural world: it adds a layer of reflection and understanding to the biologist's assessment of, say, the ecological value of a newly found species.

Thus, people of belief have a critical role to play in building a sustainable world. This document is meant to assist believers of many religious or faith traditions in claiming that role. It offers a brief orientation to sustainability issues, a review of believers' contributions and their possible relevance for sustainability, and an exploration of how believers might take action. Each section, starting with this introduction, ends with a set of guiding questions to stimulate discussion. The goal is to persuade communities of faith and spirituality of their critical role in creating a new civilization.

Scientists have not yet decided to declare a new geological epoch. But whether or not they formally name this historical moment for humanity, our challenge is to make the modern era worthy of us, by establishing a civilization characterized by wisdom and fairness. The world's faith and spiritual traditions, as ardent defenders of these values, are indispensable to this effort.

Guiding Questions

Guiding questions and the objective of each are listed following each section of this paper, as an aid to discussion.

QUESTION	OBJECTIVE
? What is my vision of a sustainable world? A sustainable nation? A sustainable community?	Clarify and articulate the meaning of sustainability for readers.
? What overlap do I see between my vision of sustainability and the teachings of my faith or spiritual tradition?	Articulate any spiritual basis for readers' understanding of sustainability.
? Where do human beings fit within my vision, and what is the role and purpose of human beings according to my faith tradition? What is the place of human beings in our world, compared to the rest of the natural world, living and non-living?	Identify whether the reader or the reader's tradition believe that humans have a special status on our planet, and if so, what responsibilities this might carry.
? How does my tradition conceptualize human progress? How would it assess human progress over the past century or more?	Identify the assertions and hidden assumptions in the reader's tradition regarding human progress, and evaluate the advances of the 21 st century.
? Is my understanding of humanity's purpose reflected in the social and economic constructs that surround us? If not, how far are human societies from the vision of development held by my faith tradition?	Identify how large a gap, if any, exists between the social and economic norms set out by my tradition, and our lived reality.
? How should human technological capacities be assessed? Should they be circumscribed in any way? If so, how?	Articulate guidelines for the adoption of new technology, inspired by spiritual and faith traditions.

Environmental Issues

The Big Picture

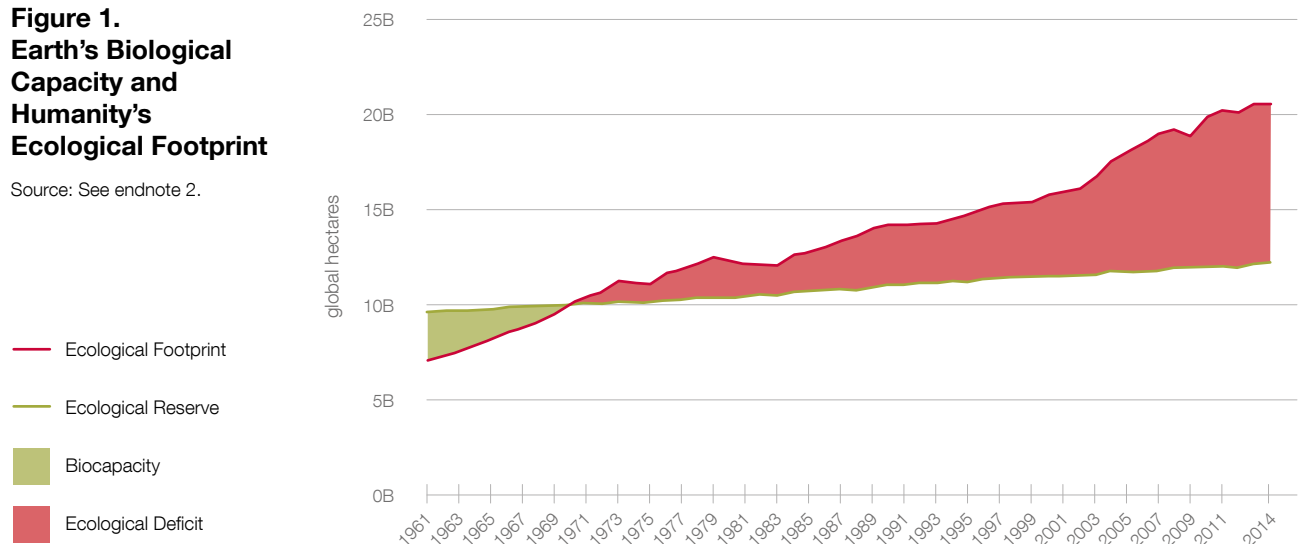
The sustainability crisis consists of dozens of interconnected environmental issues, from climate change to water scarcity to biodiversity loss, as well as social and economic issues such as inequality and hunger. Such diverse concerns resist being summarized into a single sustainability metric, but a global and long-term perspective gives a sense of the challenge of this historical moment. Big-picture studies such as the 1974 Limits to Growth model, the 2009 Planetary Boundaries research, and Ecological Footprint analysis use different methodologies to assess sustainability, but all draw the same conclusion: the industrial model of development, characterized by heavy use of fossil fuels, linear flows of materials, and high levels of waste, is not a viable long-term development strategy for the human family.

This overview discussion will use Ecological Footprint (EF) analysis to describe the big picture. EF analysis compares humanity's demand for nature with the supply of nature's goods and services. Any mismatch between demand and supply is a proxy measure of unsustainability. Demand is measured by examining human consumption of renewable resources such as food, fish, and wood, as well as services provided by nature, such as absorption of carbon dioxide. The supply of nature, called "biocapacity," is the sum of green areas available to meet our demand.

The Global Footprint Network (GFN), a sustainability research center that specializes in EF analysis, calculates that humanity has been in "ecological deficit," demanding 68 percent more in nature's goods and services than nature can sustainably supply, and that deficit has been the norm since around 1970. (See Figure 1.) Indeed, humanity's current demand for Earth's biological goods and services in an ongoing way would require 1.7 planet Earths.¹

Figure 1.
Earth's Biological
Capacity and
Humanity's
Ecological Footprint

Source: See endnote 2.



BOX 1. **OTHER BIG-PICTURE** **ANALYSES**

The Ecological Footprint is a particularly intuitive tool for understanding the unsustainable trends of modern economies. Other analyses complement EF's findings:

- The 1974 Limits to Growth modeling work showed that continuation of trends in resource use, population growth, and environmental stress could lead to overuse of resources and collapse in economies before the middle of the 21st century.
- The 2005 Millennium Ecosystem Assessment found that two-thirds of services provided by nature to humankind, including provision of fish, fresh water, and a stable climate, are being degraded or used unsustainably.
- The 2009 Planetary Boundaries framework reports that four areas—climate change, nitrogen and phosphorus pollution, land system change, and biodiversity loss—have crossed thresholds that put human activity into an “unsafe operating zone” and could disrupt major systems on which human economies depend.

How are we humans able to use the resources of 1.7 Earths when only a single planet is available to us? By raiding nature's savings accounts: cutting forests faster than they grow back, over-pumping groundwater, and catching more fish than oceans can regenerate. This overindulgence, which GFN calls “ecological debt,” cannot continue indefinitely, just as a savings account cannot be drawn down forever. The impact of draining natural capital is already evident in many places. In China and parts of the US, irrigated agriculture has been abandoned because wells have run dry. And in parts of the north Atlantic and myriad other fishing areas, wild catch is no longer possible because fish stocks have been depleted.

EF analysis is also helpful in demonstrating inequality in the use of nature's services. Wealthier countries tend to have larger per capita footprints—larger appetites for nature's goods and services—than developing ones. Table 1 shows the Ecological Footprint per person of various country groups, and the extent to which each country overshoots its biocapacity.

Table 1. Ecological Footprint Per Person of Country Groups by Income Level

Country Group	Biocapacity (Supply) (global hectares* per person)	Ecological Footprint (Demand) (global hectares* per person)	Overshoot (Deficit) (global hectares* per person)
High Income	2.9	6.1	-3.2
Upper Middle Income	2.3	3.5	-1.2
Lower Middle Income	0.9	1.3	-0.5
Low Income	1.1	1.1	-0.1
WORLD	1.7	2.8	-1.2

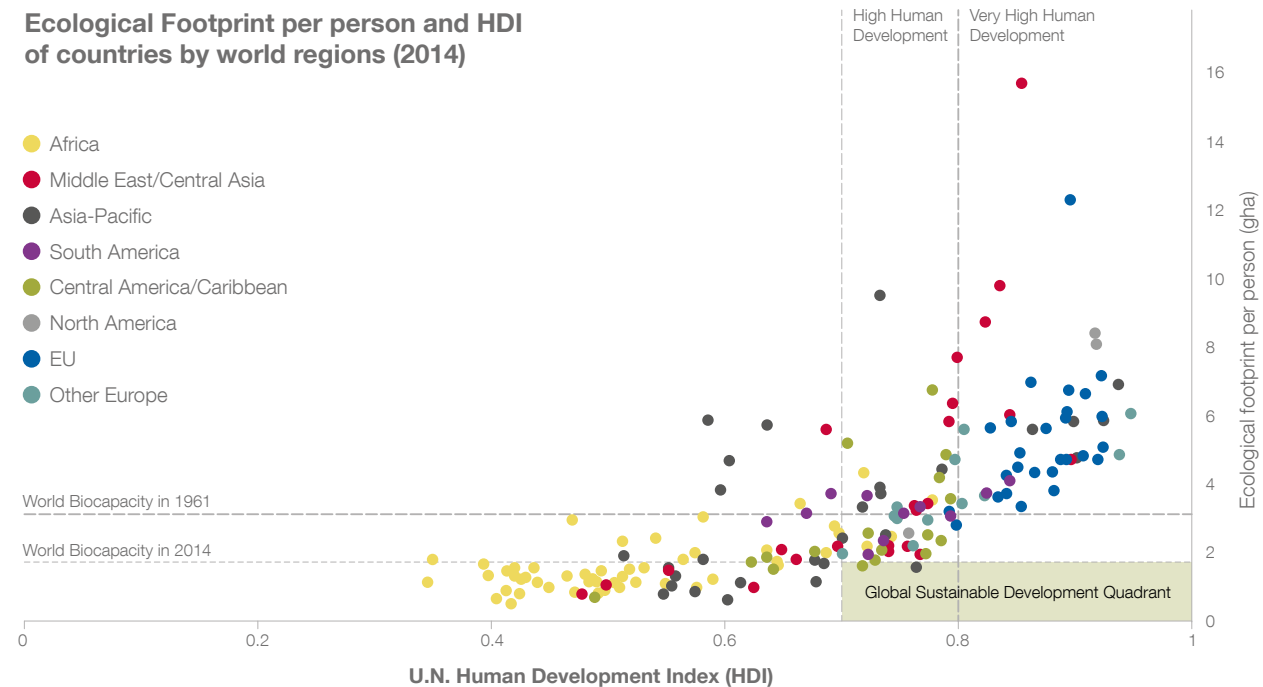
*A “global hectare” is a GFN innovation that standardizes biological areas based on average productivity. This allows different kinds of biological productivity—for example, corn produced on cropland and carbon absorbed by forestland—to be directly compared.

Source: See endnote 3.

Finally, EF analysis is useful for clarifying the meaning of sustainable development. GFN and the United Nations Development Programme have demonstrated that a clear tradeoff exists in industrial societies between human well-being and ecological health: more developed countries tend to have larger ecological demand—larger footprints—as shown in Figure 2. The bottom axis shows development level, from lowest (on the left side) to highest. The vertical axis shows ecological

impact, from least (at the bottom) to greatest. The sweet spot, where countries have a high level of development and a modest environmental impact, is the green rectangle. It is nearly empty, a visual indictment of the modern development model. The rectangle also suggests what a sustainable development paradigm needs to accomplish—care for all as well as for the planet that sustains us.

Figure 2. Development Level and Environmental Impact



Source: Ecological Footprint per person: National Footprint Accounts 2018 Edition, Global Footprint Network
Human Development Index: Human Development Report, UNDP 2016

Source: See endnote 4.

The Ecological Footprint, together with other global-level, long-term studies, demonstrates that our planet is overextended and stressed, and that humanity's approach to development requires a creative overhaul. To add specificity to this big-picture perspective, we turn next to a review of various environmental sectors.

Guiding Questions

QUESTION	OBJECTIVE
<p>❓ From a spiritual perspective, how does my tradition evaluate the collective evidence of human overreach, from mass extinctions and climate change to ecological footprints larger than the planet's capacity to support? Is this era unusual in the level of concern and response required of religious and spiritual traditions?</p>	<p>Identify the level of awareness of this unprecedented moment in human history, and the level of my tradition's response to this moment.</p>
<p>❓ How many planets would be needed if everyone on the planet adopted my lifestyle? (Use the Ecological Footprint calculator at https://www.footprintnetwork.org/resources/footprint-calculator).</p>	<p>Quantify one's own Ecological Footprint and clarify the level to which one lives within or outside the limits of Earth's capacity to provide for humanity.</p>
<p>❓ Which parts of my footprint require personal changes? Which parts require changes to social or economic structures such as availability of renewable energy or adequate public transport?</p>	<p>Build skill in seeing sustainability as both a structural and personal challenge.</p>
<p>❓ Should the Ecological Footprint have any place in my congregation's assessment of environmental responsibility? Should it have any place in my congregation's teaching, rituals, or outreach?</p>	<p>Clarify for oneself whether sustainability is a proper focus for faith and spiritual traditions.</p>
<p>❓ Review Figure 2. Sustainable development is found in the blue rectangle, with high human development and low environmental impact, yet few nations are found there. What principles or teachings does my tradition offer that could help to move my country or community there?</p>	<p>Imagine and articulate how a sustainable nation or community might achieve high levels of human development with low environmental impact. Articulate what faith and spiritual traditions might contribute to this challenge.</p>

Sectoral Review

The big-picture challenge described by the Ecological Footprint is comprised of a series of sectoral dysfunctions, in water, forests, biodiversity, and the like. We begin with climate change because it is global in scope, requires urgent attention, and dominates the environmental news. But the other issues discussed are critically important as well (and most are connected to climate). Indeed, if climate were not a concern, the world's economies would still be described as unsustainable because of the grave issues identified across each of these other sectors.

CLIMATE CHANGE

Climate change is arguably the most urgent issue on the entire sustainability agenda because of its global and highly disruptive impacts. The historic nature of the climate challenge is captured in a 2018 *New York Times* article describing a report for the Intergovernmental Panel on Climate Change (IPCC), the international group of scientists who study climate change:

A landmark report from the United Nations' scientific panel on climate change paints a far more dire picture of the immediate consequences of climate change than previously thought and says that avoiding the damage requires transforming the world economy at a speed and scale that has "no documented historic precedent."⁵

Overcoming societal lethargy regarding climate, rapidly, may be the greatest challenge of our generation.

The Challenge

Since the Industrial Revolution started in 1750, industrial and other activities have generated "greenhouse gases" such as carbon dioxide, some of which linger in the atmosphere and act like a blanket, trapping heat. The trapped heat makes the climate more volatile—storms are more frequent and intense, and heat waves, droughts and floods are more numerous.

A United Nations assemblage of scientists, the Intergovernmental Panel on Climate Change (IPCC), has issued five assessments of the state of the climate since 1990, each increasingly urgent in calling for action to stabilize emissions and curb the rise in temperatures. In response to IPCC analyses, the world's nations agreed in Paris in 2015 to develop national plans that would limit global emissions and cap global average temperature at less than two degrees Celsius above preindustrial levels, with 1.5 degrees a preferred cap. The 2015 conference also commissioned a special study, requested by nations most likely to be hurt by sea-level rise, to explore the value in striving to stay within 1.5 degrees. What difference could half a degree make?

The special report, released in October 2018, made clear that two degrees of warming would cause far greater environmental and economic impacts than 1.5 degrees. From the health of coral reefs to the productivity of farms, people and nature would be better served in preventing warming to the greatest extent possible. (See Table 2.) For example, crop yields, which have generally increased in many regions of the world since the 1960s, could well decline in this century, by more than twice as much for corn under the high cap as under the low cap. After the special report, the two degree threshold often cited in media reports is now considered by some scientists, policymakers, and advocates to be too lax a goal. The emerging preference for 1.5 degrees

is particularly sobering in light of this stubborn fact: without action on climate, the Earth is on track to warm by well over three degrees.

Table 2. Impacts of 1.5° and 2° Increases in Global Average Surface Temperature

Area of Concern	1.5°C	2.0°C	2° compared to 1.5°
Ice-free Arctic Ocean	Once per century	Once per decade	10 times more often
Coral reefs	Decline by 70-90 percent	Decline by more than 99 percent	Up to 2.9 times worse
Extreme heat waves	Experienced by 14 percent of global population at least once every 5 years	Experienced by more than 33 percent of global population at least once every 5 years	2.6 times worse
Vertebrates that lose at least half their range	4 percent	8 percent	2 times worse
Area of Arctic permafrost that will thaw	4.8 million km	6.6 million km	38 percent worse
Reduction in corn yields in tropics	3 percent	7 percent	2.3 times worse
Decline in marine fisheries	1.5 million tons	3 million tons	2 times worse

Source: See endnote 6.

Capping the temperature increase at even two degrees is economically ambitious, because it requires emissions to peak by 2020, then to be cut in half each decade thereafter. This is a tall order for societies that have been sluggish to date in addressing climate. Acting aggressively will be expensive, but not prohibitively so. A study by Lord Nicholas Stern has found that the cost of staying within a two-degree C temperature cap could be as much as two percent of global GDP—but that this is much less than the cost of not acting.⁷ Importantly, the longer the delay in acting, the more expensive the problem becomes.

A Range of Responses

Because many scientists are skeptical that emissions can be cut deeply and quickly, calls are now emerging to consider using geoengineering initiatives to limit temperature rise. Proposed strategies include schemes to pull carbon from the atmosphere or deflect solar rays. These might prompt unintended consequences that could be monumental for the planet. The question facing the human family now is whether we will commit to the hard work of emissions reductions or embark on a risky geoengineering option.

To achieve deep cuts in emissions, nations need to adopt low-carbon solutions. An example comes from the US state of California, which passed a law mandating that all of the state's electricity come from renewable sources by 2045.⁸ In addition, consumers have a role to play. About a third of food produced globally is wasted—in industrial countries, largely by consumers—meaning that the energy and greenhouse gases associated with that share of the world's food production is also wasted.

Guiding Questions

QUESTION	OBJECTIVE
<p>❓ How do my tradition's sacred texts and teachings talk about climate and weather, storms, floods and drought? What picture of climate emerges from these teachings? What picture emerges of the divine vis-à-vis these teachings? Of humans vis-à-vis these teachings?</p>	Make the link between the wisdom of one's tradition and the modern challenge of climate change.
<p>❓ Who should bear the financial burden for addressing climate change? What is the responsibility of nations that have been historically high emitters?</p>	Recognize an important moral dimension of climate change and reflect on how one's tradition might address the challenge.

AIR POLLUTION

Air pollution is the poster child of environmental challenges, a problem dating back to at least 1285 when King Edward I of England banned the burning of coal to improve air quality.⁹ Air pollution remains a major global challenge today, despite decades' worth of efforts to address the problem. The World Health Organization (WHO) reports that 90 percent of people worldwide breathe air containing high levels of pollutants, and that around seven million people worldwide die each year from polluted outdoor and indoor air.¹⁰

The problem varies by development level, with low- and middle-income countries suffering the most. In those regions, 97 percent of cities with a population of 100,000 or more do not meet WHO air quality guidelines. In wealthy countries, the share of cities outside the WHO guidelines is 49 percent.¹¹

Outdoor Air Pollution

Polluted air results largely from the burning of carbon-rich fuels, with virtually all sectors implicated, from industry and power plants to households, transportation, and even agriculture. In addition, sand and desert dust and waste burning also damage air quality. And local conditions such as geography and weather can affect pollution levels.¹²

Ambient (outdoor) air pollution accounts for an estimated 4.2 million deaths per year.¹³ Respiratory diseases and lung cancer are perhaps not surprising consequences, but air pollution can also bring on stroke and heart disease as well. The worst-hit regions are the Western Pacific and Southeast Asia.¹⁴

Beyond impacts on human health, air pollution leads to "acid rain" which acidifies soils and waterways, often harming wildlife. Nitrogen oxides, a byproduct of fossil fuel combustion in power plants and vehicles, can result in over-fertilization (eutrophication) of waterways. This stimulates algae growth at the expense of

other organisms, leading to oxygen-deficient “dead zones” in bodies of water. Pollution can also lower crop yields and slow forest growth, and of course the carbon in pollution contributes to climate change.

Indoor Air Pollution

Some three billion people in developing countries have little choice but to cook using open fires or stoves that burn wood, animal dung, or crop waste.¹⁵ With little ventilation indoors, families are exposed to levels of pollution, especially of soot, that are far beyond WHO recommended maximums. These families suffer elevated incidences of stroke, heart disease, chronic obstructive pulmonary disease (COPD) and lung cancer, leading to more than 3.8 million premature deaths annually. Nearly half of deaths from pneumonia among children under five are caused by soot inhaled in their own homes.¹⁶

Some developing countries are taking steps to improve air quality. Cleaner transport and greater energy efficiency, together with better municipal waste management, are effective measures for reducing air pollution outdoors. And clean cookstoves are of great help in reducing indoor pollution.

Guiding Questions

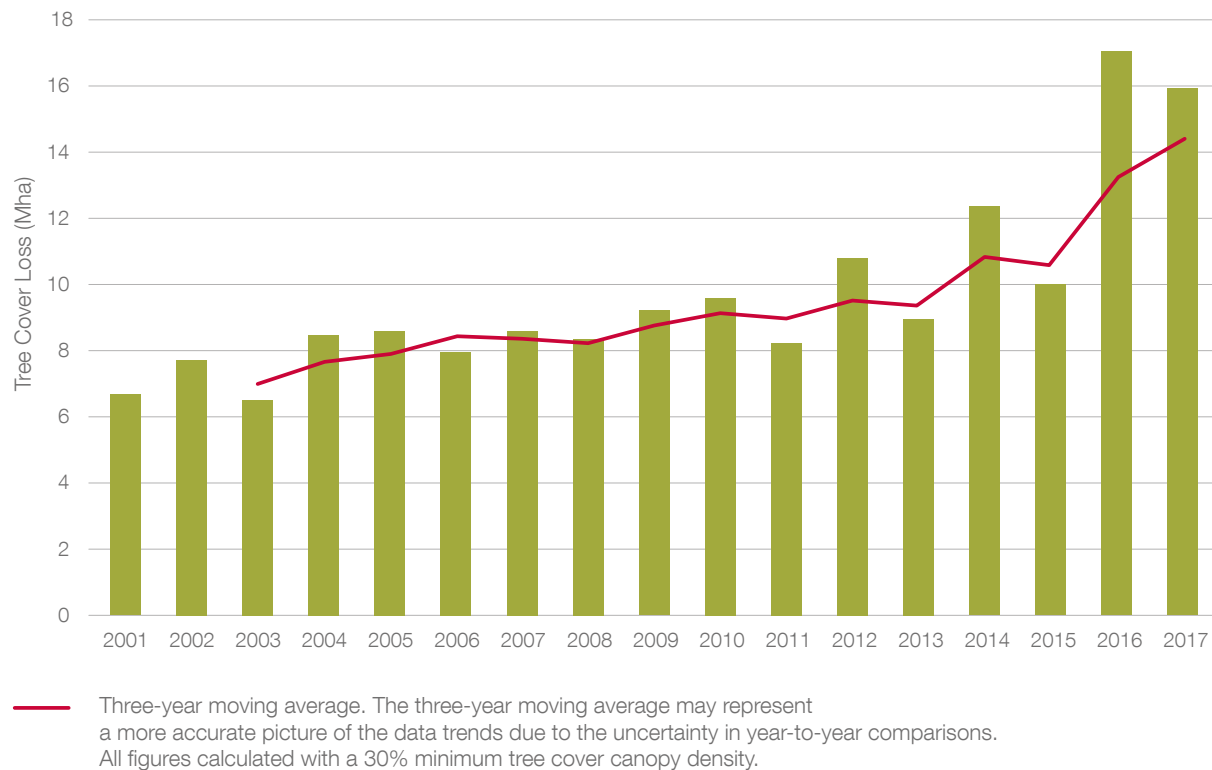
QUESTION	OBJECTIVE
<p>❓ How do my tradition's scriptures and teaching speak about the air, wind, and breath? Does wind or breath have a divine nature? From this perspective, what does it mean if air is polluted or fouled?</p>	<p>Make the link between the wisdom of one's tradition and the modern challenge of air pollution.</p>
<p>❓ Some air pollution, such as emissions from cars, comes from industrial-level economic activity. Other pollution comes from burning wood, charcoal, or dung in the homes of poor people. How does my tradition help me to distinguish and assess these very different forms of air pollution? Would my tradition's teachings on air, wind, and breath apply to both forms of pollution?</p>	<p>Wrestle with the complex nature of this problem and identify the implications of that complexity for development in general. For example, what should society's response be when an economic advance that will build prosperity and create jobs is also shown to carry serious environmental or social liabilities?</p>

DEFORESTATION

Deforestation continues to be a serious problem in some world regions, although the rate of forest loss is slowing. The 2015 forestry assessment from the UN's Food and Agriculture Organization (FAO) reports that an area the size of Peru, some 129 million hectares of forests, was deforested globally between 1990 and 2015.¹⁷ Over the same period the rate of forest loss decreased from 7.3 to 3.3 million hectares per year.¹⁸ Forests now cover about 31 percent of the world's land area, down from about 32 percent in 1990.

The forest area numbers are net data—they take into account both losses and gains in forested area. Temperate forests actually expanded somewhat in the 2015 FAO assessment, while boreal and subtropical forests were largely unchanged overall.¹⁹ Losses continue to come largely from tropical areas; substantial losses in 2016 and 2017 were roughly twice the level of the early 2000s.²⁰ (See Figure 3.)

Figure 3. Tropical Tree Cover Loss, 2001-2017



Source: See endnote 21.

Importantly, some of the gains in forested area consist of planted (as distinguished from natural) forests. Forest plantations are economically efficient ways of producing timber, but they do not have the same levels of biodiversity or offer the same levels of ecosystem services as natural forests.

Drivers and Impact

Agriculture and timber production are strong drivers of deforestation. In Latin America, land is cleared to grow soybeans and sugar cane, and to raise cattle, often for export. In Asia, land is cleared to provide palm oil, coconut, rubber and teak, again for overseas markets. In Africa, forest clearing is primarily driven by fuel wood collection and charcoal production for domestic use. In sum, the growing demand for food, fuel and timber products worldwide is a strong driver of deforestation.

Deforestation has a number of environmental and social impacts. For example, it accelerates climate change. Felled trees are no longer available to capture carbon, and if burned or left to rot, they release greenhouse gases back to the atmosphere, a double blow to the climate. But other factors in deforestation work in the opposite direction, cooling the climate in areas north of 45° latitude, and reforestation has a cooling effect as well. Deforestation and reforestation result in net emissions equal to about eight percent of greenhouse gas emissions worldwide.²² However, an additional factor is important as well: a great deal of deforested area becomes farmland, which emits greenhouse gases. The result, according to the World Resources Institute, is that since 1850 changes in land use and land cover are responsible for 40 percent of today's human-driven warming. Put simply, deforested areas, especially when converted to farmland, are quite harmful to the climate.²³

Another significant new area of research suggests that forests affect the way water cycles across the planet, and that deforestation could have a huge impact on rainfall in many regions, perhaps drying up major food-producing regions. Forests give off huge quantities of water vapor, which returns to Earth as rainfall, often far from the original forest. Scientists worry that large-scale deforestation in major tropical forests in the Congo, Southeast Asia, and the Amazon could “pose a substantial risk to agriculture in key breadbaskets halfway round the world in parts of the US, India, and China.”²⁴ Such an occurrence could rival climate change in its impact on the interior areas of some continents.²⁵

Clearly the conservation of existing forests and restoration of deforested areas is important for a host of environmental reasons. The World Resources Institute estimates that such measures, along with improved management of tropical forests, mangroves, and peatlands could provide 23 percent of the mitigation action needed to limit global warming to two degrees.²⁶ Add to this the water, biodiversity, and other benefits of forest conservation and remediation, and the value of such an approach is clear.²⁷

Guiding Questions

QUESTION	OBJECTIVE
<p>? What significance do trees hold in my faith or spiritual tradition? How are trees related to human well-being in my tradition's teachings? Do teachings around trees contain a conservation ethic?</p>	<p>Make the link between the wisdom of my tradition and the modern challenge of deforestation and associated habitat loss.</p>
<p>? Given the role of trees in sequestering carbon, could tree planting in my congregation's space, or at a larger geographic level, help to curb climate change? What spiritual meaning might be associated with such planting activity?</p>	<p>Begin to imagine how environmental protection might be advanced within my own congregation, and how this work might be integrated into our congregational life.</p>

SOIL DEGRADATION

Soil health is declining on all continents in a largely invisible but highly consequential challenge to the creation of sustainable economies. Soil degradation affects a wide range of associated issues, from food supply to water availability to climate change.

Global-scale data on soil degradation is scarce because of the challenges of mapping greatly varying conditions across vast areas. But studies in the 1990s and 2000s suggested that some 15 to 24 percent of land globally is degraded, which means that it has suffered physical damage (e.g., erosion) or chemical damage (salinization) enough to reduce its productivity.²⁸ In 2018 a new UN-backed study generally confirmed that finding, reporting that between 1998 and 2013, roughly 20 percent of the world's vegetated land surface exhibited ongoing declines in productivity. The lost productivity was found in 20 percent of cropland, 16 percent of forest land, 19 percent of grassland, and 27 percent of rangeland.²⁹

The continuing loss and degradation of soils unfolds as the demand for food continues to increase. In 2018 the number of hungry people in the world rose for the third consecutive year after several years of decline; some 821 million people—one out of nine members of the human family—are chronically hungry today,³⁰ and demand for food is expected to increase by 50 percent between 2013 and 2050.³¹ At the same time, land suitable for farming, but not yet under cultivation, is increasingly scarce and limited largely to Latin America and Africa. And land is increasingly used for non-essential purposes: more than a third of all grain produced worldwide is fed to cattle for meat production, an inefficient use of this food.³² In addition, climate change will be disruptive to food production. These pressures on the food supply system make healthy soils more critical than ever.

Land degradation occurs as pressures on land for food and other goods and services continue to mount. In the past two decades, land harvested area has expanded by 16 percent, irrigated area has doubled, and agricultural output has nearly tripled.³³ But this impressive output has often been achieved using unsustainable practices. Soil tillage leads to erosion, and overuse of irrigation water can salinize soils, causing a loss of fertility, abandonment of land, and eventually, desertification. The head of external relations for the United Nations Convention to Combat Desertification has likened industrial agriculture to an extractive industry similar to mining, because of its focus on short-term gain at the expense of long-term viability.³⁴

Care for land requires changes to land-use practices, especially in agriculture. Proponents of regenerative agriculture—an approach to farming that is built around advancing and maintaining soil health—advocate for soil-centered agricultural policies. Others point to the role consumers can play in conserving soils, by reducing demand for meat, which would reduce the need for high-yield feed production. Preserving forests and wetlands and avoiding their conversion to farmland would be helpful as well.

WATER SCARCITY

Earth is called the Blue Planet for its abundance of water, yet clean, fresh water is an increasingly scarce resource. More than 99 percent of the planet's water is saltwater or ice that is largely unavailable for human use—less than one percent is the fresh water in lakes, rivers, and aquifers on which humanity and much of nature depends.³⁵ In the face of this fixed supply, demand for water grows with expanding populations and

economies, and supply patterns are disrupted in many regions by a changing climate. All of these factors make fresh water a scarce resource in a growing number of world regions.

A 2018 report from the World Bank and the United Nations documented that 36 percent of the world's population lives in water-scarce regions, and that the share could grow to half of the world's people by 2050. It also estimates that some 700 million people could be displaced by water scarcity by 2030.³⁶ Some countries are particularly vulnerable. For example, in India, 54 percent of the total area of the country faces high to extremely high water stress, according to the World Resources Institute's India Water Tool.³⁷ At the global level, severe water scarcity—defined as water withdrawals greater than 40 percent of total renewable supply of surface water—extends broadly like a belt across the middle of the world. (See Figure 4.)³⁸

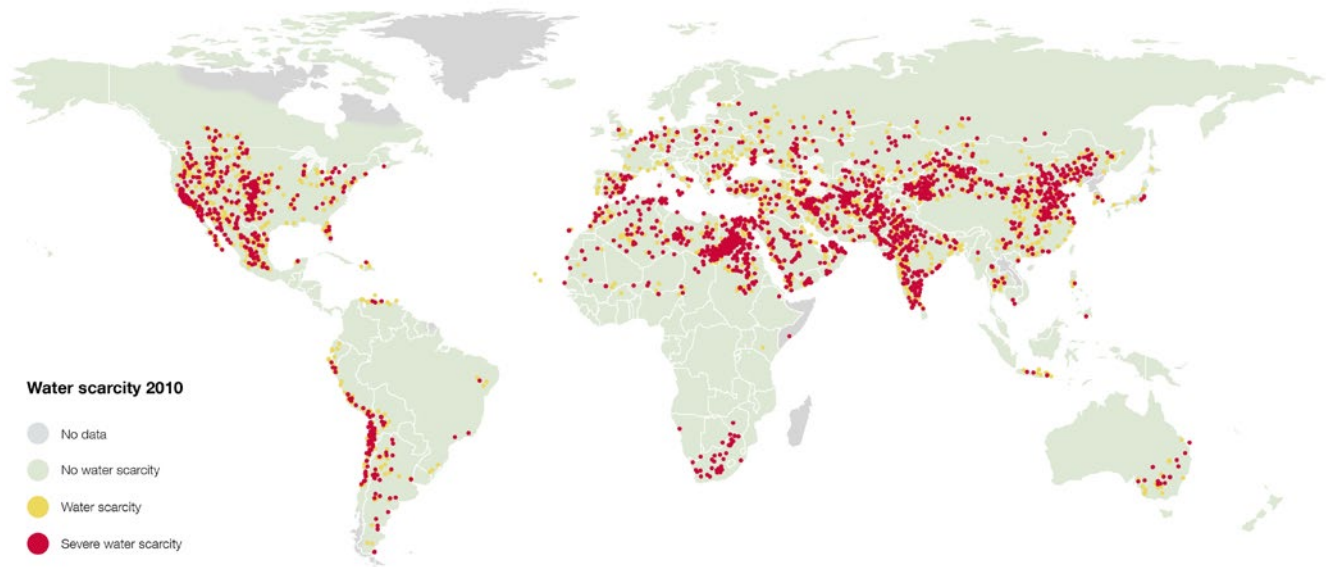


Figure 4. Physical Water Scarcity in 2010

Source: See endnote 39.

The issue is not abstract in some regions. In 2015, some Sao Paulo, Brazil residents went days without water as a combination of drought and poor water management led to severe shortages. And Cape Town, South Africa continues to warn that “Day Zero” may not be far off. The city’s piped water could be turned off because water levels in reservoirs are at critical levels.

A large share of the world’s people experiences water scarcity on at least a temporary basis. A 2016 study found that some two-thirds of the global population circa 2000, about four billion people, experienced severe water scarcity for one month or more per year.⁴⁰ The *2018 World Water Development Report* projected that by 2050, the population subject to such temporary shortages could number between 4.8 billion and 5.7 billion.⁴¹

Scarcity of groundwater (water from wells), which accounts for about 30 percent of all freshwater on Earth,⁴² represents a quiet crisis because its disappearance is entirely unseen. A 2012 study in the

journal *Nature* estimated that some 20 percent of the world's groundwater deposits, called aquifers, are pumped faster than they can be recharged by rainfall, meaning that their water levels are falling.⁴³ Over-pumping characterizes 54 percent of 4000 wells studied in India, for example; the World Bank estimates that within 20 years, 60 percent of that nation's wells could be in critical condition.⁴⁴

Some of the most-exploited aquifers in the world are in highly productive agricultural areas, such as the Central Valley and High Plains of the United States, the North China Plain in China, the Nile Delta of Egypt, and the Upper Ganges of India and Pakistan.⁴⁵ On the North China Plain, which produces about half of all of China's wheat, over-pumping means that wells are now dug more deeply, 120-200 meters compared with only 20-30 meters a decade ago. Pumping from such depths is energy intensive and can be expensive, costing as much as half of a farmer's annual income.⁴⁶

Impact of Scarcity

Water scarcity touches societies in fundamental ways. When clean water is in short supply, people must resort to poor-quality water, which sickens and even kills children and the elderly. The World Bank and United Nations estimate that more than two billion people worldwide drink contaminated water.⁴⁷

Scarcity can also affect agriculture, and therefore food production. Farming is the most water-intensive of all human activities, accounting for about two-thirds of water consumption at the global level. And irrigation—the controlled application of water to crops, as distinguished from the random watering of crops from rainfall—makes farming highly productive. Irrigated farmland accounts for only 16 percent of arable land in use today, but it delivers 44 percent of global crop production.⁴⁸ Thus, where water scarcity reduces the capacity to irrigate, the result is a disproportionate loss of food production.

Response to Scarcity

Extreme water scarcity does not necessarily translate to immediate suffering or economic consequences: Singapore and Israel have very low water availability per person. But avoiding human deprivation under such conditions requires water-centric policies and investments and leaves little room to absorb additional population growth. Indeed, as population expands in many water-tight countries, the number of people living under conditions of absolute water scarcity could reach 1.8 billion by 2025.⁴⁹

Some countries have turned to imports of water-intensive products to reduce their own need for water. Jordan, for example, imports “virtual” water in the form of products and their processing, that equals *five times* its own yearly renewable water resources. Other water-scarce countries that depend heavily on imports of virtual water are Greece, Italy, Portugal, Spain, Algeria, Libya, Yemen and Mexico.⁵⁰ In practice, such a strategy often means importing food—because food is very water-intensive—leaving many countries dependent on world markets for a growing share of their food supply.

Individuals can contribute to conserving water, especially through their food choices. Meat consumption accounts for about one quarter of humanity's water footprint, largely because of the water needed to grow feedstuffs for cattle.⁵¹ Thus, shifting one's eating to less water-intensive forms of meat (for example, chicken rather than beef), or away from meat consumption altogether, can save large quantities of water, and could

be more healthful as well. Shifting to a vegetarian diet in an industrial country could reduce an individual's water consumption by 36 percent.⁵²

Guiding Questions

QUESTION	OBJECTIVE
? Water is a powerful symbol of cleanliness and purification in many traditions. Does water pollution carry any moral offense in my tradition?	Make the link between the wisdom of my tradition and the modern challenge of water scarcity, including scarcity created by water pollution.
? How does my tradition think about the overuse of water? What might my tradition offer to create a greater ethic of sacredness around water, so that water is viewed with respect, and not merely as a commodity?	Think about how my tradition's teaching might contribute to creation of a more sustainable culture in the community and society around me.

BIODIVERSITY LOSS

Possibly the most underappreciated threat from the palette of environmental challenges facing our planet today is the weakening of natural systems through biodiversity loss. Whether at the genetic, species, or ecosystem level, the complexity of life on Earth is diminishing—a particularly troubling development for those who regard nature as a gift from the divine. Because the diversity of living things is the product of millions of years of evolution, some have described the massive loss of biodiversity as “burning the library of life.”⁵³

Many biologists say we live in an era of mass extinction, the sixth in our planet's 4.6 billion-year history, and the first caused by humans.⁵⁴ Species are disappearing at many times the natural rate: the International Union for the Conservation of Nature reports that 25 percent of mammal species, 13 percent of bird species, and 41 percent of amphibian species are threatened with extinction.⁵⁵ The number of threatened mammals, birds, and amphibian species is up by double-digit percentages since 1996/1998.⁵⁶

Beyond global species extinctions, biologists document extensive population declines of many species and local disappearances. Nearly half of the 177 mammal species surveyed in a recent study were found to have lost more than 80 percent of their geographic range between 1900 and 2015.⁵⁷ An example is the lion, which was once found in most of Africa, southern Europe, the Middle East, and northwestern India, but are now confined to scattered areas of sub-Saharan Africa and a small part of India.⁵⁸ Authors of the study note that many local species losses “will have negative cascading consequences on ecosystem functioning and services vital to sustaining civilization.” They go on: “We describe this as a ‘biological annihilation’ to highlight the current magnitude of Earth's ongoing sixth major extinction event.”⁵⁹

Biodiversity loss also means loss of “ecosystem services,” the natural functions that are the foundation of all human activity, including economic activity. These services range from pollination of plants by bees, capture of atmospheric carbon for storage in plants and the ocean, water filtration and purification in wetlands, and erosion prevention provided by plant roots.⁶⁰ These services, provided by nature at no charge, were estimated in 2014 to be worth \$125 trillion.⁶¹ It is also estimated that degradation and ecosystem losses erased trillions of dollars’ worth of services between 1997 and 2011.⁶²

Loss of biodiversity is the result of a variety of human activities. As we introduce changes in land use (by cutting forests for agriculture or converting wildland to urban built-up area); overuse natural resources such as fisheries and forests; facilitate, usually unwittingly, the movements of invasive species; burn fossil fuels that change the climate; and continue to emit pollutants, we harm natural areas and species.⁶³ In these and other ways, human activities are dominating the planet. Indeed, by one estimate, human activities claim between 25 and 40 percent of the planet’s net primary productivity (a measure of the biological output on our planet), which marginalizes other species in their efforts to survive. Figure 5 gives a sense of how species abundance declines in forests and grasslands as human intervention increases. Photos of undisturbed areas (at top) are the baseline, with full populations of species. The share of species populations declines as human activity increases.⁶⁴

Figure 5. Species Abundance and Human Activity

Source: See endnote 65.



Recreating a planet that nurtures a full range of life requires dedicated effort. Parties to the Convention on Biological Diversity in 2010 set up 20 goals known as the Aichi Biodiversity targets, a set of voluntary goals ranging from halting overfishing and controlling invasive species to reducing the rate of deforestation by half. A 2014 report, however, showed that only two of the 20 goals were on track to being met.⁶⁶ Ironically, one of the targets on track to be met—setting aside 17 percent of our planet’s land area in wildlife reserves—may be woefully insufficient. Harvard biologist E.O. Wilson argued in 2017 that fully half the planet’s area should be set aside for nature.⁶⁷

Guiding Questions

QUESTION	OBJECTIVE
<p>❓ Biodiversity loss could be viewed as the destruction of Creation, or destruction of the interconnected web of life. Does my tradition view it in either of these ways?</p>	<p>Make the link between the wisdom of my tradition and the modern challenge of species extinctions and other biodiversity loss.</p>
<p>❓ Species extinctions have occurred five times before in the history of our planet, all naturally (not driven by human activities). Does my tradition help me to understand the current mass extinction as morally different from previous extinctions? If so, how?</p>	<p>Think about what difference is found in degradation caused by humans compared with degradation caused by other forces.</p>

OCEANS

The world’s oceans cover some three-quarters of the Earth’s surface and are vital to economies worldwide, even in landlocked nations. Oceans help to regulate climate, provide food, foster economic activity, and protect biodiversity, among other benefits.⁶⁸ Despite their importance, the world’s oceans are overexploited and degraded at levels not seen in 55 million years, when acidified ocean waters caused widespread marine extinctions—to the point that these trends threaten massive changes to human societies.⁶⁹

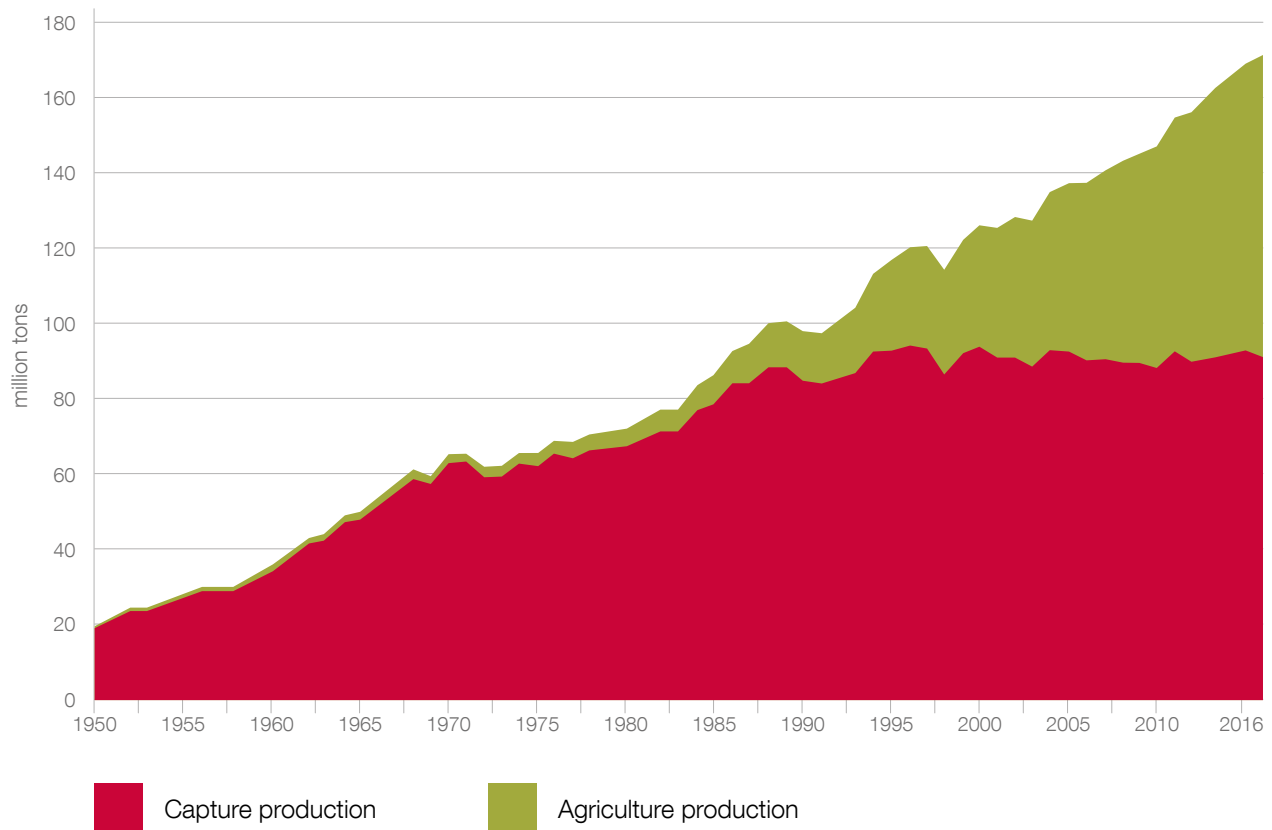
Global Fish Catch

Perhaps the most well-known indicator of the decline in ocean health is the decline of fisheries due to overfishing. The Food and Agricultural Organization of the United Nations (FAO) reported in 2018 that 33 percent of marine fisheries are fished beyond sustainable levels, up from 10 percent in 1974. All told, 93 percent of marine fishery resources are fished at or beyond sustainable levels. Global marine fish catch has been flat since the mid-1990s as overfishing has become more common.

One response to marine overfishing has been the development of aquaculture, or fish farming. Today, nearly as many fish are farmed as caught, a major shift in sourcing that has allowed fish consumption to increase

faster than global population.⁷⁰ (See Figure 6.) But aquaculture carries costs. It replaces what had been a freely provided, wild fish with farmed fish that must be fed, raised, and protected from disease.

Figure 6. World Capture Fisheries and Aquaculture Production



Source: See endnote 71.

Oceanic Degradation

Oceans are credited with slowing the rate at which the planet is warming, because they take up carbon that would otherwise have remained in the atmosphere. But this blessing is likely to diminish as the world's oceans become saturated with carbon. Some scientists argue that the rate of oceanic carbon uptake is already slowing.⁷²

Meanwhile, the oceans' carbon absorption service is making oceans sicker, because the extra carbon makes their water more acidic. Today the seven seas are 30 percent more acidic than before the Industrial Revolution.⁷³ Acidification weakens the shells of organisms such as corals, oysters, clams, mussels, and snails,⁷⁴ and requires them to spend more energy building and maintaining their shells. This leaves less energy for their own growth and reproduction.

Acidification also helps drive the decline of coral reefs, among the most species-rich ecosystems on the planet. Of the 29 World Heritage sites designated by the United Nations Educational, Scientific, and Cultural Organization, 25 experienced bleaching (damage from coral caused by warming waters) between 2014 and 2017.⁷⁵ In the same period, Australia’s Great Barrier Reef endured the longest and most destructive mass bleaching event,⁷⁶ which killed 29 percent of its shallow-water corals.⁷⁷

Coral reefs support some 25 percent of all marine fish species,⁷⁸ because they act as centers of spawning, refuge, and feeding for a wide range of species. This in turn makes them rich fishing areas that support coastal communities, often in poor countries. Reefs also protect coastlines from storm surges and violent wave action and are a growing source of ingredients for new medicines. The US National Oceanic and Atmospheric Administration (NOAA) estimates the value of reefs to be in the billions of dollars.⁷⁹

A separate source of serious marine pollution is nutrient runoff. As fertilizers wash from farms into streams and rivers, then reach the open sea, they create oxygen-deprived “dead zones” devoid of marine life. Such zones can be sizable: the dead zone in the Gulf of Mexico, formed by farm runoff that enters the Mississippi River and flows to the sea, was more than 15,000 square kilometers in 2013, about the size of Connecticut. With the intensification of agriculture since the 1960s and the use of greater quantities of fertilizer, the number and extent of dead zones worldwide has spread dramatically. The United Nations Development Programme identifies more than 500 dead zones worldwide, affecting a total area about the size of the United Kingdom.⁸⁰

Guiding Questions for Oceans

QUESTION	OBJECTIVE
<p>❓ What role do the sea, fish, and ships play in the teachings and sacred writings of your tradition?</p>	<p>Make the link between the wisdom of my tradition and the modern challenge of oceanic degradation and overuse.</p>
<p>❓ How does your tradition help you to grapple with the astounding notion that vast areas of ocean have been fished out, or rendered “dead zones” through human activity? What does this say about the power of humans vis-à-vis nature, and what view or guidance does your tradition offer on how to wield that power?</p>	<p>Provide another opportunity to think about this unique moment in human history, when human powers are at unprecedented levels, and what this means from a faith or spiritual perspective.</p>

Guiding Questions for Sectoral Issues Overall

QUESTION	OBJECTIVE
<p>❓ How does my tradition value our planet's resources beyond their worth as commodities? In what ways does my tradition encourage viewing air, water, trees, and soil as sacred gifts or divine possessions, and how does this inform my use of them?</p>	<p>Develop a perspective on resources as gifts, not just commodities, and ponder how this shift in perspective might affect our use of resources.</p>
<p>❓ Does my tradition appreciate “nature’s services” — pollination of crops by bees, purification of the air by trees, flood control by plant roots, and many others—as well as the goods our planet provides?</p>	<p>Develop a consciousness of nature as offering not just resources, but a wide range of services, all of which are critical for sustainable human civilization.</p>
<p>❓ How would my tradition answer this question: To what extent should the great resources of the Earth—the air, sea, and land—be regarded as belonging to everyone?</p>	<p>Consider the extent to which resources such as the atmosphere or the oceans should belong to all, rather than be privately owned. Also, how far down the resource list should an ethic of “resources as commons” extend?</p>
<p>❓ Does my tradition promote a rootedness and appreciation of the places in which we are rooted? If so, does this rootedness help to cultivate an ethic of conservation?</p>	<p>Develop an awareness that a strong sense of rootedness may help create a love of place and a desire to protect it. Examine if and how one’s tradition helps to promote a sense of place.</p>

Religious Assets to Protect the Earth

A strategist interested in designing a global infrastructure for change would do well to study the world's faith and spiritual traditions. Consider their toolbox for societal transformation: numerous adherents who meet regularly and form deep relational ties; physical assets, including land and buildings; meaningful amounts of investment capital; and most powerfully, moral teaching and spiritual tools such as prayer, song, and liturgical practices. At a conceptual level at least, the world's faith and spiritual traditions sit atop an impressive infrastructure for societal transformation.

Of course, religious and spiritual traditions exist for reasons deeper than creating societal change, and it is cynical to view these traditions merely as instruments of change. (The cynical perspective also betrays poor understanding of the nature of religious and spiritual power, which paradoxically often calls for humility, and detachment from outcomes.) Indeed, an instrumentalist posture can alienate people of belief. As one national representative of a Christian denomination in Washington, DC remarked, "We are not interested in becoming the latest rented constituency for the global environmental movement."

That said, the global sustainability crisis will affect the entire planet and all societies, and people of faith can choose a greater or lesser role in addressing it. Arguably, the interests of people of belief and advocates of sustainability align closely on a range of issues. For this reason, believers in many traditions are exploring how a commitment to sustainable policies, practices, and lifestyles might fit comfortably within their tradition.

MORAL ASSETS

People of faith and spirituality often possess a moral energy that compels engagement on a wide range of public issues. In the past two centuries alone, religions have been involved in the abolitionist movement in the UK and US, the anti-apartheid movement in South Africa and the civil rights movement in the US, and in many nations, the anti-nuclear, debt-relief, and immigration-rights movements. The moral power of religious voices is a powerful addition to debate on these important matters. Today people of belief can use their moral standing to address sustainability issues, by deepening the scientific basis for sustainability with powerful stirrings that act beyond the cognitive and rational realm.

Consider, for example, the role that Daoists have played in turning Chinese medicine away from the use of ingredients taken from endangered species such as rhinos and tigers. Chinese civil law was ineffective in stopping the use of rhino horn and tiger bones in medicine, but Daoist authorities, operating within the Daoist worldview of practitioners of traditional Chinese medicine, were more persuasive. Drawing on their faith's belief in the oneness of the universe, Daoist teachers concluded that it is not possible to heal one species by destroying another. And they offered alternatives, drawing from their ancient medical scriptures, which did not involve endangered species.⁸¹

Similarly, religious deliberation in Tanzania persuaded Muslims to end their use of dynamite in fishing, which had increased their productivity but at great environmental cost. As with the Chinese healers, government efforts at educating the fishers were not effective. Nor were laws prohibiting the practice. But local sheikhs became involved and examined the practice in the light of Quranic teaching. Verses such as "...eat and drink:

but waste not by excess for Allah loveth not the wasters” (7:31) were powerful in suggesting that dynamite fishing ran counter to the will of Allah. The sheikhs abandoned the practice and helped fishers to learn sustainable fishing practices. Martin Palmer and Victoria Finlay report that the religious approach succeeded because “it made sense within people’s culture and worldview.”⁸²

A more difficult task may be for spiritual and faith traditions to challenge the consumerist ethic that drives so many modern economies. American historian Gary Cross asserts that the 20th century was not won by capitalism or socialism, but by consumerism, so definitively has the drive to acquire and consume reorganized the lives of billions, peacefully and without coercion. The materialist ethic that saturates modern economies is a tough nut to crack.

Yet the world’s faith and spiritual traditions are well-equipped to do so. Most traditions have warned, often for thousands of years, of the danger of excessive attachment to the material world. (See Box 2.) And environmental writer Bill McKibben once wrote that “among the institutions of our society, only the communities of faith can still posit some reason for human existence beyond the constant accumulation of stuff.” Programs such as GreenFaith’s Living the Change initiative offer excellent tools for living more thoughtfully vis-à-vis the environment and the concept of fairness. Yet persuading adherents to moderate consumption is a huge challenge for people of faith and spirituality in the decades ahead.

SOCIAL ASSETS

People of belief also possess a strong set of assets—the land, buildings, investment capital, and other resources held by members or their institutions. These tools are increasingly used in innovative ways to build sustainable communities and societies.

Consider the Catholic Energies program to bring clean energy and energy efficiency to a wide variety of Catholic-owned buildings in the US, from parishes and schools to hospitals and retreat centers. The program brings together specialists in energy technologies, financiers, and managers or owners of Catholic properties to create facility upgrades—from new lighting and heating systems to renewable energy sources

Box 2. Selected Religious Perspectives on Consumption

BAHÁ’I FAITH

” In all matters moderation is desirable. If a thing is carried to excess, it will prove a source of evil.” (Baha’u’llah, Tablets of Baha’u’llah)

BUDDHISM

” Whoever in this world overcomes his selfish cravings, his sorrows fall away from him, like drops of water from a lotus flower.” (Dhammapada, 336)

CHRISTIANITY

” No one can be the slave of two masters...You cannot be the slave both of God and money.” (Matthew, 6:24)

CONFUCIANISM

” Excess and deficiency are equally at fault.” (Confucius, XI.15)

DAOISM

” He who knows he has enough is rich.” (Dao De Jing)

HINDUISM

” That person who lives completely free from desires, without longing...attains peace.” (Bhagavad-Gita, II.71)

ISLAM

” Eat and drink, but waste not by excess: He loves not the excessive.” (Q’uran, 7.31)

JUDAISM

” Give me neither poverty nor riches.” (Proverbs, 30:28)

such as solar energy—quickly and affordably. The Catholic institution pays a single monthly subscription fee that is affordable because of the savings in energy costs. And the institutions avoid the need to raise capital for the project.⁸³

Or consider the case of land ownership by the Maronite Church in Lebanon. When the UN Environment Programme (UNEP) sought in 1990 to preserve the forest of Harissa on the coast of Lebanon, they wrote to the landowner, the Maronite Church, which had held the forest for 1000 years. UNEP stated the scientific and legal arguments for conserving the forest, but did not mention the forest's longstanding spiritual significance for the Church. The Church did not respond. But when the Alliance for Religions and Conservation approached Church authorities about making a sacred gift of the forest—essentially pledging to preserve it—the Patriarch quickly agreed. The faith-centered approach is credited with achieving the conservation outcome.

Communities of faith and spirituality are flexibly established for local, national, and global impact. Local congregations of a few hundred or a few thousand persons can undertake low-risk, small-investment experiments that allow them to test new ideas, without the need to pass legislation or raise huge sums of capital. For example, a number of congregations have established their own credit unions, an important asset for low-income members seeking to avoid payday lenders. And many congregational experiments, especially visible ones such as vegetable gardens and solar panels, essentially become demonstration projects for their larger communities.

At the same time, many congregations are linked with others in networks that may be local, national, or even global in extent, allowing congregations to multiply their social influence, achieve operational efficiencies, and move the needle on sustainability issues.

SPIRITUAL ASSETS

Many would argue that the greatest assets of many faith traditions are their most intangible ones: the prayers, songs and liturgies that mediate our relationship to the divine. These spiritual assets may seem removed from mundane concerns such as recycling and solar energy, but they can be the spark that keeps environmental commitment alive, and the tool that makes our actions sacred.

Cultural ecologist E.N. Anderson notes that environmentally oriented ritual helps people to forge emotional connections with nature, creating a strong motivation to value and protect it. By contrast, ties to nature in industrial societies tend to be weak because specialized roles allow us to live without learning to grow our own food, fetch our own water, or cut our own fuelwood. Thus, people in industrial countries often cannot describe where our water comes from, how far the lettuce on our tables has traveled, or where our garbage and sewage winds up.

Some traditions employ spiritual assets to bring healing to the environment around them. In Thailand, Buddhist monks are known to ordain trees, giving a sacred character to what is often viewed as merely an economic asset. They choose the largest tree in the grove, wrap a saffron robe around it, and undertake an ordination ceremony. The symbolic act communicates to the entire village that the forest conservation effort is not merely a civic activity, but is imbued with sacred meaning, thereby protecting the tree and the grove in which it stands.

The power of spiritual assets is sometimes breathtaking. The story is told of the Allied and German soldiers in World War I who stopped their fighting on Christmas Eve when one side started to sing “Silent Night,” a Christmas favorite whose melody was familiar on both sides. Soon soldiers who had targeted one another for death found themselves sharing chocolate and cigarettes in the “no man’s land” between the enemy trenches. That a religious song could essentially bring war to a halt, however briefly, suggests the power of spiritual assets to speak to the heart and to change behavior.

Guiding Questions

QUESTION	OBJECTIVE
? How might my tradition be called to use land, buildings, purchasing power, or influence in the effort to build sustainable communities? Should sustainability values such as energy efficiency and minimizing the use of plastics be standard practices in my faith or spiritual tradition?	Begin to think creatively about physical assets and how they and their use might be steered in a more sustainable direction.
? To what extent should our community’s financial assets, and the financial assets of individuals in the community, be managed using sustainability criteria?	Begin to think creatively about financial assets and how they might be used to promote greater sustainability.
? Does my tradition help members to see ourselves as inhabitants of a bioregion as much as we are citizens of a political jurisdiction?	Begin to think creatively about community location, and how consciousness of this might steer a congregation in a more sustainable direction.
? Should ownership of property carry obligations to the environment and to the community? If so, does my tradition reflect this in its ownership and management of land and buildings?	Begin to think creatively about ownership and its obligations.
? Should laws protect only the rights of humans, or does nature have rights as well—for example, the right of a species not to be driven to extinction?	Begin to think critically about non-human life and whether one’s tradition sees any room for rights for other forms of life.
? Should strengthening local economies be a priority?	Think about the environmental and social impact and advantages of local production and consumption.

Multi-Religious Action on Local, National, Regional, and Global Levels

Many faith and spiritual traditions are composed of a network of communities that can be mobilized for great impact. These networks are best organized to operate efficiently, in two ways. First, they can act in concert with communities of other traditions, eliminating duplicated effort. Multi-religious cooperation softens discord among faith or spiritual traditions by deepening mutual understanding and aligning communities around common challenges. Cooperation also highlights complementary strengths, allowing each tradition to leverage assets for the greatest overall impact. And it facilitates public partnerships as traditions band together to work with non-religious actors.

A second type of efficiency occurs when communities of belief coordinate their own local, national, regional, and global units to operate effectively. This does not necessarily mean a strictly hierarchical approach to work. Instead, actions loop around and through each of the levels in ways that are reciprocal and reinforcing. In this way, the various levels learn from one another and avoid duplication of effort.

LOCAL

The local level—the municipality, neighborhood, and congregation—is where communities of belief engage life concretely. Here sustainability is made visible through environmental initiatives, sustainable lifestyles, and advocacy.

Environmental initiatives—Many communities of faith turn to teachings and ritual to inspire and guide their environmental work. In Mongolia, for example, communities have used sacred Buddhist texts to help deal with environmental challenges ranging from overgrazing and water scarcity to pollution and waste disposal. Buddhist leaders have recovered lost sacred texts that explain the sacred nature of each of hundreds of Mongolia's holy mountains and valleys, as well as how each should be honored. Many of these sites are important for biodiversity and for maintaining groundwater levels. The Buddhist community has begun to erect stone markers at several of these sites explaining how the trees, animals, and land should be protected.⁸⁴

Lifestyles—Communities of belief can influence how lifestyle decisions are made, from what to eat to the length of a shower. This is because the personal relationships formed in local communities generate *trust*. When believers know and trust one another, they can offer each other the trust and accountability needed to support difficult decisions. A sustainability ethos may seem restraining and joyless: limit your meat consumption, use your car less, cut back on purchases. Fellow believers can remind one another that such questions can be framed joyfully: simple living means less to manage, less stress, more to share, and most of all, greater freedom to respond to a spiritual call. The concept of fasting, which is practiced in many traditions, can add a spiritual dimension when used to guide environmental efforts. Thus some Christians find the practice of a Lenten fast to be a helpful way to approach reducing carbon or meat consumption.

Advocacy—Communities of belief can also engage members to act politically. The energy for letter-writing, marches, boycotts and the like are often found at the local level, where friends are known and influence

one another. Many congregations will call on members to support campaigns in favor of any number of sustainability issues, if they fit within a congregation's spiritual worldview, or if they deal with issues affecting their congregants.

NATIONAL

The most consequential frameworks for environmental action are built at the national level, where national faith organizations are found, and where political policy is made.

Many communities of belief are represented at the national level by federations, associations, councils and other organs that leverage a tradition's teaching across a nation. A good example of this is the 2018 Daoist community's call for local Daoist associations and temples to respond to "the call to build ecological civilization." Building on work since 2009 to undertake ecological education, build sustainable temples, promote healthy lifestyles, practice careful resource management and encourage green pilgrimage and tourism, the Daoist Ecological Temple Network (DETN) called for using temples as demonstration sites for sustainable building. In Daoist medicine, DETN encourages using herbs to the greatest extent possible rather than animal parts such as rhino horns, which endanger some species. The network's membership covers 200 temples across 28 provinces. DETN sees great alignment between ecological principles and Daoist teaching, including "the harmony between heaven, earth, and humanity"...and..."shared prosperity of all beings."⁸⁵

Or consider the "US Catholic Climate Declaration" issued in response to the notice by the US administration of its intent to withdraw from the Paris Agreement. Some 600 Catholic institutions of all types—schools, religious orders, dioceses, colleges, parishes, healthcare institutions, social welfare units, and others—called on the US government to remain "a global leader in reducing emissions" and to "return to the Paris Agreement." The document allowed Catholics, who make up approximately 25 percent of the US population, to speak out on an important issue with a unified voice.⁸⁶

REGIONAL

Opportunities for engagement sometimes emerge at the subnational level, or between the national and global levels when groups of nations or organizations coordinate efforts. The climate partnerships of groups of US states, for example, and the deliberations of mayors in the C40 groups of cities are examples of potential venues for impact. Consider, for example, the statement issued by the Interfaith Summit on Climate Change in support of small-island and low-income states in their struggle to manage the effects of climate change.⁸⁷ It used language rarely heard in political statements that appeal beyond the level of cognition, with assertions such as "we commit to stimulating consciences," and "We pray for you and for all humanity in caring for the earth." Such statements, offered across regions and denominations, invariably communicate in a broad and deep way.

Importantly, global-level entities such as UNEP are now looking to subnational groups to contribute solutions to intractable problems, given the lack of leadership sometimes found at the national level.⁸⁸ This could be read as a call for nongovernmental organizations, including those that represent faith and spiritual traditions, to become involved in these issues.

GLOBAL

The global dimension is valued for its agenda-setting power, as evidenced, for example, by the embrace of the United Nations' Millennium Development Goals or the 2015 Paris Agreement on Climate. At fora that attract the attention of global media, faith, spiritual, and religious traditions can weigh in to express their views on particular issues. Consider, for example, the multi-faith action taken at the United Nations climate conference (COP 23) in Bonn in 2017. There, Buddhist, Catholic, Evangelical, Hindu, Jewish, Muslim, Protestant, and Unitarian faith leaders released an Interfaith Climate Statement on Sustainable Lifestyles. The statement called on the world's spiritual, faith, and religious traditions to achieve the ambitious 1.5-degree cap emerging from the 2015 Paris Agreement by "dramatically reducing emissions from home energy use, adopting a plant-based diet and reducing food waste, and minimizing automobile and air travel."⁸⁹ The statement added an important moral voice to the climate discussion, and in its focus on lifestyle choices, addressed an area that gains little traction in sustainability discussions. It is also an area in which faith groups have a particular standing, because of their long history of teaching on materialism.

Faith traditions can also act independently at the global level to appeal to their membership and to the entire world. A clear example is Pope Francis' 2015 encyclical, *Laudato Si'*, a major teaching document of the Catholic Church and the first ever produced on the environment. Issued six months before the December 2015 COP 21 climate conference in Paris, *Laudato Si'* was designed to weigh in on that important meeting, and to awaken Catholics and the world community to the urgency of the climate issue.

Guiding Questions

QUESTION	OBJECTIVE
? What are some of the institutions of my tradition at the local, national, regional, and global levels?	Map out the institutional and geographic structure of my tradition.
? How does information flow among the various levels of my tradition? Is this flow as efficient as it could be?	Become aware of communications patterns across my tradition and identify bottlenecks as well as effective flows.
? Is my tradition active in inter-religious and interdenominational networks that can keep us apprised of opportunities for information-sharing and collaboration?	Become aware of connections to other traditions that may be helpful in advancing sustainability efforts.

Multi-Stakeholder Partnership

Examples of successful religious partnerships such as the anti-apartheid movement in South Africa, the US civil rights movement and the Jubilee 2000 debt-reduction movement demonstrate the importance of coalitions in driving social change. In each case, people of belief worked closely with other societal actors to advance a cause, bringing change more quickly and efficiently than if they had acted in isolation. Engaging with a diverse set of partners increases effectiveness, broadens one's perspective, and strengthens the web of enduring civic relationships. This is especially important for the sustainability movement, which requires quick and massive action to create economies that are low in carbon, low in waste, and low in use of virgin materials.

For the modern environmental sustainability movement, several potential partners for faith and spirituality communities are easy to identify. Local- and national-level environmental, conservation, animal advocacy, and sustainability groups often welcome collaboration with people of belief. Communities of believers can offer the full set of assets identified earlier, and may also be appreciated for their commitment and credibility. For their part, sustainability and environmental groups offer an entrée to engaging these issues through myriad programs, from letter-writing campaigns to cleanup events at local rivers and parks.

LEVERAGING ASSETS

Beyond the easily named partners, potential alliances can be identified from a creative review of the assets that people of belief bring to the sustainability challenge. For example, beyond greening their own campuses, purchases and investments, congregations and faith and spiritual institutions could leverage their resources by collaborating with similarly placed sister institutions to become a force for systemic change. This could take many different forms for particular congregations. These ideas might spark possibilities for your congregation:

Buildings—As building owners interested in sustainability, faith communities could help to change the rules in the building sector. Imagine faith communities working with trade groups of architects, engineers, builders, and city planners to create or update codes of ethics to incorporate sustainability as a guiding precept in their work. Changes to building codes to require efficiency minimums in a city's buildings, creation of sustainability norms in engineering ethics, and commitment to using recycled and recyclable materials among builders could quickly lighten the footprint of the building sector, which uses roughly 40 percent of energy in many cities.

Or perhaps an advocacy partnership could be formed with labor unions to promote massive retrofitting of buildings for energy efficiency, likely a large source of employment. Perhaps workers displaced by the shift out of fossil fuels could be prioritized for these new jobs?

Land—Congregations sometimes own meaningful swaths of land, especially at larger facilities such as retreat centers. Could they collaborate with other institutional land owners to lobby government entities to create strong incentives for conservation easements, so that land is allowed to remain largely undeveloped? And where congregational land is smaller and urban but with patches of greenery, could congregations band

together to explore with local authorities and conservation organizations how patches citywide could become nodes in healthy biodiversity corridors that support wildlife?

Purchasers—Congregations can purchase green supplies, but their impact might be greater if they could work with other congregations or nonprofits to bolster the markets for green products. This could be done by joining or creating purchasing co-ops for commonly used goods and services. Would this be a natural function for congregations?

Investments—Individual investors in congregations can find socially responsible investment options, but far greater impact can be realized at the corporate level. Federations or networks of religious organizations can commit at the national or global level to invest in holdings that advance the public good and do not advance interests that harm the environment or the poor. Beyond this, individual members might organize themselves in investment circles for the same purpose.

Teachings—The values espoused by faith and spiritual traditions are potential springboards for partnership. Simple living values could be deepened among congregants through partnership with local or national environmental or simple living advocacy groups. Nature appreciation could be similarly advanced via partnerships with conservation and environmentally focused NGOs.

LEVERAGING MISSION

Sustainability involves redesigning economies to be low-carbon, low-waste, and with low levels of virgin materials use. It also requires a dignified life for people, through adequate employment, health, and education for all. In many economies, the greatest leverage points for sustainability action—where congregational commitments can yield the greatest reductions in energy use, waste generation, and material use—are in buildings, food, and transport. (Industry, forests, and energy sectors could yield even greater sustainability gains for some congregations/institutions, depending on location and interest.)

Fortunately, existing congregational outreach work overlaps with sustainability concerns. Identifying these intersections is an opportunity to think strategically about potential partnerships to lighten footprints. How might a sustainability dimension to traditional outreach programs—soup kitchens, health clinics, homelessness services, and overseas assistance—suggest new partnership possibilities? Matrix 1 is a tool to help generate such possibilities. It offers ideas for partnerships to stimulate thinking, along with blank spaces for your own ideas.

Matrix 1. Partnership Idea Generator: Matching Congregational Outreach and Sustainability Interests

Key:

- L Local-level partnership possibilities
- H Higher-jurisdiction partnership possibilities
- A Advocacy partnership possibilities

	BUILDINGS	FOOD	TRANSPORT
SOUP KITCHENS	<p>L Work with certification programs to ensure that materials are sustainably procured.</p> <p>H :</p> <p>A :</p>	<p>L Partner with pro-organics NGOs and congregations to bolster urban food security by establishing city-wide networks of vegetable gardens. Or partner with sustainable agriculture organizations or organic farms to glean or otherwise procure organic produce.</p> <p>H :</p> <p>A Partner with advocates of food waste reduction to create infrastructure for collecting discarded foods from supermarkets for composting or (where safe), for use at soup kitchens.</p>	<p>L Partner with transport-focused NGOs to create and use a fleet of cargo bicycles to deliver vegetables from congregational gardens to soup kitchens, and to model one form of sustainable transport.</p> <p>H :</p> <p>A :</p>
HOMELESS SERVICES	<p>L Partner with employment and social service agencies to involve homeless populations in building their own shelters (perhaps "tiny houses") whose size and design results in low environmental impact.</p> <p>H :</p> <p>A :</p>	<p>L :</p> <p>H :</p> <p>A :</p>	<p>L :</p> <p>H :</p> <p>A :</p>
OVERSEAS ASSISTANCE	<p>L :</p> <p>H Partner with disaster relief agencies for rapid congregational assistance to the victims of storm disasters.</p> <p>A :</p>	<p>L :</p> <p>H Partner with development assistance agencies to create programs linking reductions in meat consumption, and the associated monetary savings, with increased development assistance to low-income people.</p> <p>A :</p>	<p>L :</p> <p>H :</p> <p>A :</p>
HEALTH CLINICS	<p>L :</p> <p>H :</p> <p>A :</p>	<p>L :</p> <p>H :</p> <p>A :</p>	<p>L :</p> <p>H :</p> <p>A Partner with health advocacy organizations for creation of a fleet of carbon-free ambulances, preferably available at no cost to low-income patients.</p>
EDUCATION	<p>L :</p> <p>H Work with national-level environmental and sustainability organizations to create educational modules on sustainability for incorporation into religious education programs.</p> <p>A :</p>		

EVALUATING POTENTIAL PARTNERSHIPS

Creating effective partnerships requires recognition of the unique strengths and expertise of other agencies. *Religions for Peace* suggests using the following questions to evaluate a potential partnership:⁹⁰

- What is the mission of the agency or organization? Does it align with the mission of our own congregation or institution?
- Has the organization worked collaboratively with other organizations in the past? If so, how might collaboration with religious groups be different?
- Does the organization have resources to contribute to shared projects?
- How might our own congregation or institution benefit from this partnership?
- What are the possible challenges that can be anticipated?

Guiding Questions

QUESTION	OBJECTIVE
❓ What is missing from my community's skill set? What other communities have those skills? Would they be logical partners for us?	Inventory the assets that are needed but unavailable within my tradition for advancing sustainability work. Identify potential partners who possess these assets.
❓ Which assets from my tradition offer mutually beneficial partnership possibilities to accelerate the achievement of sustainability outcomes?	Inventory assets of one's tradition that are complementary to those of other traditions and that might serve as ground for collaboration.
❓ What are the most important outreach efforts in my tradition, and how do they intersect with sustainability concerns? What partnership possibilities are inspired by considering these interests?	Identify the outreach priorities of one's tradition and evaluate each for sustainability features.

Conclusion

This moment in human history is clearly one of threat to our planet and to the human family. Yet it also represents a tremendous opportunity. Societies worldwide can learn to re-appreciate their relationship to the natural world, create a more equal economy, and rethink our understanding of progress. Indeed, we are positioned to undertake the most ambitious redesign of civilization ever envisioned. This work requires knowledge, skill, and committed action, to be sure, but it also requires *inspiration*—the divine spark that can guide the design and building of just and sustainable societies and economies. Thus, people of belief are critical in this transformation. The many gifts possessed by the world's spiritual, faith, and religious traditions are essential complements to secular efforts to create sustainable models of progress. Our contributions are needed, urgently.

As people of belief undertake this challenge, we would do well to lead with the optimism and hope that characterize us. We are indeed fortunate to be part of this blessed moment in human history.

Endnotes

- 1 Global Footprint Network, *Earth Overshoot Day*, <https://www.footprintnetwork.org/our-work/earth-overshoot-day/>, (16 November 2018).
- 2 <https://www.footprintnetwork.org>
- 3 Global Footprint Network, *NFA Public Data Package v3*, www.footprintnetwork.org (16 November 2018).
- 4 <https://www.footprintnetwork.org> .
- 5 Coral Davenport, "Major Climate Report Describes a Strong Risk of Crisis as Early as 2040," *New York Times*, October 7, 2018.
- 6 Kelly Levin, *Half a Degree and a World Apart: The Difference in Climate Impacts Between 1.5°C and 2°C of Warming*, World Resources Institute, <https://www.wri.org/blog/2018/10/half-degree-and-world-apart-difference-climate-impacts-between-15-c-and-2-c-warming>, (24 October, 2018).
- 7 Nicholas Stern, "Economic development, climate and values: making policy," *Proceedings of Biological Science*, August 7, 2015.
- 8 The Editorial Board, "In California, Facts and Science Still Matter," *The New York Times*, 3 September, 2018.
- 9 Peter Brimblecombe, "Attitudes and Responses Toward Air Pollution in Medieval England," *Journal of the Air Pollution Control Association*, 26:10, 941-945.
- 10 World Health Organization, "9 out of 10 people worldwide breathe polluted air, but more countries are taking action," WHO press release, <https://www.who.int/news-room/detail/02-05-2018-9-out-of-10-people-worldwide-breathe-polluted-air-but-more-countries-are-taking-action>, (2 May, 2018).
- 11 Ibid.
- 12 Ibid.
- 13 Ibid.
- 14 Ibid.
- 15 Ibid.
- 16 World Health Organization, "Household air pollution and health," <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>, (8 May, 2018).
- 17 FAO, *Global Forest Resources Assessment 2015 How Are the World's Forests Changing?* (Rome: FAO, 2016).
- 18 Ibid.
- 19 Ibid.
- 20 Frances Seymour, *Deforestation Is Accelerating, Despite Mounting Efforts to Protect Tropical Forests. What Are We Doing Wrong?* World Resources Institute, <https://www.wri.org/blog/2018/06/deforestation-accelerating-despite-mounting-efforts-protect-tropical-forests>, (26 June, 2018).
- 21 Ibid.
- 22 Michael Wolosin and Nancy Harris, *Tropical Forests and Climate Change: The Latest Science*, World Resources Institute, <https://wriorg.s3.amazonaws.com/s3fs-public/ending-tropical-deforestation-tropical-forests-climate-change.pdf>, (June, 2018).
- 23 Ibid.
- 24 Ibid.
- 25 Fred Pearce, "Rivers in the Sky: How Deforestation Is Affecting Global Water Cycles," *Yale Environment* 360, 24 July, 2018.
- 26 Michael Wolosin and Nancy Harris, *Tropical Forests and Climate Change*.
- 27 Ibid.
- 28 L.R. Oldeman, et al., *World Map Of The Status Of Human-Induced Soil Degradation: An Explanatory Note*, Global Assessment of Soil Degradation (GLASOD), International Soil Reference and Information Centre, http://www.isric.org/sites/default/files/ExplanNote_1.pdf, and Z. G. Bai, "Proxy global assessment of land degradation," *Soil Use and Management*, http://www.geo.uzh.ch/microsite/rsi-documents/research/publications/peer-reviewed-articles/2008_ProxyGlobal_SoilUseMgmt_ZB-0471031552/2008_ProxyGlobal_SoilUseMgmt_ZB.pdf, September, 2008, 24, 223–234.
- 29 United Nations Convention to Combat Desertification, *The Global Land Outlook*, first edition, Executive Summary, (Bonn, Germany: UNCCD, 2017).
- 30 FAO, IFAD, UNICEF, WFP and WHO, *The State of Food Security and Nutrition in the World 2018, Building climate resilience for food security and nutrition*, (Rome: FAO, 2018).
- 31 FAO, *The future of food and agriculture – Trends and challenges*, (Rome: FAO, 2017).
- 32 Author's calculations based on data at United States Department of Agriculture, Production, Supply and Distribution database.
- 33 United Nations Convention to Combat Desertification, 2017.
- 34 Jonathan Watts, "Third of Earth's soil is acutely degraded due to agriculture," *The Guardian*, 12 September, 2017.

- 35 United States Geological Survey, *The World's Water*, <http://water.usgs.gov/edu/earthwherewater.html>, (2 December, 2016).
- 36 High-Level Panel on Water Outcome Document, *Making Every Drop Count: An Agenda for Water Action*, (Washington, DC: 2018).
- 37 World Resources Institute, India Water Tool, <https://www.wri.org/blog/2015/02/3-maps-explain-india-s-growing-water-risks>, (26 February, 2015).
- 38 United Nations World Water Assessment Programme/UN-Water, *The United Nations World Water Development Report 2018: Nature-Based Solutions for Water*, (Paris: UNESCO, 2018), 12.
- 39 Ibid.
- 40 Mesfin M. Mekonnen and Arjen Y. Hoekstra, "Four Billion People Facing Severe Water Scarcity," *Science Advances*, 12 February, 2016.
- 41 United Nations World Water Assessment Programme/UN-Water, 2018.
- 42 United States Geological Survey, 2016.
- 43 United Nations Environment Programme, "A Glass Half Empty: Regions at Risk Due to Groundwater Depletion: Why is this issue important?" (https://na.unep.net/geas/getuneppagewitharticleidsript.php?article_id=76, (January, 2012).
- 44 World Resources Institute, *India Water Tool*; World Bank, *India Groundwater: A Valuable but Diminishing Resource*, <https://www.worldbank.org/en/news/feature/2012/03/06/india-groundwater-critical-diminishing>, (6 March, 2012).
- 45 United Nations Environment Programme, *A Glass Half Empty*.
- 46 Malin Falkenmark, "Growing water scarcity in agriculture: future challenge to global water security," *Phil Trans R Soc A*, <http://www.water.ox.ac.uk/wordpress/wp-content/uploads/2013/10/Phil.-Trans.-R.-Soc.-A-2013-Falkenmark-.pdf>
- 47 High-Level Panel on Water Outcome Document, *Making Every Drop Count: An Agenda for Water Action*, (Washington, DC: 2018).
- 48 Nikos Alexandratos and Jelle Bruinsma, *World Agriculture Toward 2030/2050: The 2012 Revision*, <http://www.fao.org/docrep/016/ap106e/ap106e.pdf>, (Rome: FAO, June 2012).
- 49 UN Water, *International Decade for Action*, "WATER FOR LIFE" 2005-2015, <http://www.un.org/waterforlifedecade/scarcity.shtml>, (24 November, 2014).
- 50 A.Y. Hoekstra, "Water Security of Nations: How International Trade Affects National Water Scarcity and Dependency," in *Threats to Global Water Security*, http://link.springer.com/chapter/10.1007%2F978-90-481-2344-5_3, NATO Science for Peace and Security Series C: Environmental Security, 2009, 27-36.
- 51 Arjen Y. Hoekstra, "The hidden water resource use behind meat and dairy," *Animal Frontiers*, <http://www.waterfootprint.org/Reports/Hoekstra-2012-Water-Meat-Dairy.pdf>, (April, 2012).
- 52 Ibid.
- 53 Esa Valiaverronen, and Iina Hellsten, "From 'Burning Library' to 'Green Medicine': the role of metaphors in communicating biodiversity," *Science Communication*, 24, (1 December, 2002) 229-245.
- 54 Gerardo Ceballos, Paul R. Ehrlich, Anthony D. Barnosky, Andrés García, Robert M. Pringle, and Todd M. Palmer, "Accelerated modern human-induced species losses: Entering the sixth mass extinction," *Science Advances*, 19 June, 2015.
- 55 International Union for the Conservation of Nature (IUCN), 'Table 1: Numbers of threatened species by major groups of organisms (1996-2018),' IUCN Red List, http://cmsdocs.s3.amazonaws.com/summarystats/20181_Summary_Stats_Page_Documents/2018_1_RL_Stats_Table_1.pdf, (5 October, 2018).
- 56 Author calculations based on data in International Union for the Conservation of Nature (IUCN), 'Table 1: Numbers of threatened species.
- 57 Ceballos et. al, 2017.
- 58 Ibid.
- 59 Ibid.
- 60 The Economics and Ecosystems of Biodiversity, *Ecosystem Services*, <http://www.teebweb.org/resources/ecosystem-services/>, (13 October, 2018).
- 61 Robert Costanza, Rudolf de Groot, Paul Sutton, Sander van der Ploeg, Sharolyn J. Anderson, Ida Kubiszewski, Stephen Farber, R. Kerry Turner, "Changes in the Global Value of Ecosystem Services," *Global Environmental Change*, May 2014.
- 62 Ibid.
- 63 Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being*, (Washington DC: Island Press, 2005).
- 64 Netherlands Environmental Assessment Agency (PBL), *Rethinking Global Biodiversity Strategies: Exploring structural changes in production and consumption to reduce biodiversity loss*, (The Hague: PBL, 2010), 38.
- 65 Ibid.
- 66 Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 4* (Montréal: CBD, 2014).
- 67 Edward O. Wilson, *Half-Earth: Our Planet's Fight for Life* (New York: W.W. Norton, 2017).

- 68 Box 1 from World Health Organization, *Nutrition: Global and regional food consumption patterns and trends: Availability and Consumption of Fish*, http://www.who.int/nutrition/topics/3_foodconsumption/en/index5.html; Food and Agriculture Organization of the United Nations, *World Review of Fisheries and Aquaculture 2012*, <http://www.fao.org/docrep/016/i2727e/i2727e01.pdf>.
- 69 Sarah Burch, Sara Harris, *Understanding Climate Change: Science, Policy, and Practice* (Toronto: University of Toronto Press, 2014), 128.
- 70 FAO, *The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals* (Rome: FAO 2018), 4.
- 71 FAO, *The State of World Fisheries and Aquaculture 2018*, 3.
- 72 Galen A. McKinley, et al., “Convergence of atmospheric and North Atlantic CO₂ trends on Multidecadal Timescales,” *Nature Proceedings*, <http://proceedings.nature.com/documents/5993/version/1>, (8 June, 2011).
- 73 National Oceanic and Atmospheric Administration, *Ocean Acidification*, <https://www.noaa.gov/resource-collections/ocean-acidification>.
- 74 Woods Hole Oceanographic Institution, *Ocean Acidification*, <https://www.whoi.edu/main/topic/ocean-acidification>.
- 75 Heron et al., *Impacts of Climate Change on World Heritage Coral Reefs : A First Global Scientific Assessment*, (Paris: UNESCO World Heritage Centre, 2017) 4.
- 76 Great Barrier Reef Marine Park Authority, *Interim report: 2016 coral bleaching event on the Great Barrier Reef*, (Townsville, Queensland: GBRMPA, 2016).
- 77 Great Barrier Reef Marine Park Authority, *2016 Coral Bleaching Event*, <http://www.gbrmpa.gov.au/about-the-reef/reef-health/record-breaking-sea-surface-temperatures>, (4 October, 2018).
- 78 Mark D. Spalding, Corinna Ravilious, and Edmund P. Green, *World Atlas of Coral Reefs*, (Berkeley: University of California Press, 2001), pp. 10 and 40.
- 79 National Oceanic and Atmospheric Administration, *The Value of Coral Ecosystems*, <http://coralreef.noaa.gov/aboutcorals/values/>
- 80 United Nations Development Programme, *Ocean Hypoxia—Dead Zones*, <http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Water%20and%20Ocean%20Governance/Oceans%20and%20Coastal%20Area%20Governance/OCEAN%20HYPOXIA%20ISSUE%20BRIEF.pdf>
- 81 Hounaida A. El Jurdi, Wided Batat, Aliakbar Jafari, “Harnessing the Power of Religion: Broadening Sustainability Research and Practice in the Advancement of Ecology,” *Journal of Macromarketing*, 11 October, 2016.
- 82 Ibid.
- 83 “Catholic Energies looks to help church organizations go green,” *Catholic News Service*, October 3, 2017.
- 84 Urantsatsral Chimedsegee, Amber Cripps, Victoria Finlay, Guido Verboom, Ven Munkhbaatar Batchuluun, Ven Da Lama Byambajav Khunkhur, *Mongolian Buddhists Protecting Nature: A Handbook on Faiths, Environment and Development*, (Bath, UK: ARC 2009).
- 85 Alliance for Religions and Conservation, *Proposal of the Seven-Year Plan (2019 to 2025) for Environmental Protection in the Chinese Daoist Community*, <http://www.arcworld.org/faiths.asp?pageID=202>, (12 October, 2018).
- 86 Catholic Climate Covenant, *US Catholic Climate Declaration*, <https://catholicclimatecovenant.org/us-catholic-climate-declaration>, (1 October, 2018).
- 87 Interfaith Summit on Climate Change, *Climate, Faith and Hope: Faith traditions together for a common future*, <http://interfaithclimate.org/the-statement>, (14 October, 2018).
- 88 Hsu, A., Widerberg, O., Weinfurter, A., Chan, S., Roelfsema, M., Lütkehermöller, K. and Bakhtiari, F., “Bridging the emissions gap - The role of non-state and subnational actors,” in *The Emissions Gap Report 2018*, (Nairobi: United Nations Environment Programme, 2018).
- 89 Parliament of the World’s Religions, *Walk on Earth Gently: A Multi-Faith invitation to Sustainable Lifestyles*, <https://parliamentofreligions.org/publications/%E2%80%9Cwalk-earth-gently%E2%80%9D-multi-faith-invitation-sustainable-lifestyles-%E2%80%A2C2%A0cop23-interfaith>
- 90 Religions for Peace, *A Guide for Building Women of Faith Networks*, (New York: Religions for Peace, 2009).

