Konrad Adenauer Stiftung

MAHIDOL UNIVERSITY
Wisdom of the Land

A PLANETARY AND GLOBAL ETHICS FOR CLIMATE CHANGE AND SUSTAINABLE ENERGY

EDITED BY : IMTIYAZ YUSUF

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Edited by

Imtiyaz Yusuf

College of Religious Studies, Mahidol University
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and malnutrition, and is founder of the Buddhist Climate Action Network, providing a framework for Buddhists from all traditions to engage in efforts to effectively address climate change through action. She helped organize Buddhist participation in the People's Climate March (PCM) in New York City (Sept 2014) and the People's Climate Train from San Francisco to the PCM. Ven. Santussika received an M.S. degree in Computer Science at Indiana University, Bloomington in 1987 and an M.Div. degree in San Jose, California in 2002. After 15 years of working as a software designer and engineer, she began visiting monasteries in 1999 where she learned from master teachers mostly in the Ajahn Chah lineage. Her time at Buddhist monasteries in America and Asia inspired her to ordain as a *bhikkhuni*.

Professor Dr. Richard Foltz is Professor of Religion and Founding Director of the Centre for Iranian Studies at Concordia University in Montreal, Canada. His books include *Iran in World History* (Oxford, 2015), *Religions of Iran: From Prehistory to the Present* (Oneworld: 2013) and *Religions of the Silk Road* (revised 2nd edition, Palgrave Macmillan, 2010).

Dr. Mohammed Ghanim Al-Ali Al-Maadheed is the President of Qatar Red Crescent (QRC), and also Vice-President of the International Federation of Red Cross Red Crescent Societies (IFRC), he addressed the high-level plenary session during the United Nations Climate Change Conference (COP18) in 2012 at Doha, Qatar. Dr. Al Maadheed led the 48-person delegation of Red Cross Red Crescent experts throughout the COP-18 proceedings in Doha, for climate change negotiations attended

by government ministers, state secretaries, leaders of international and intergovernmental organizations, and other Heads of Delegation from around the world.

Dr. Dennis P. McCann is Director of Research at Rothlin International Management Consulting, Ltd. (RIMAC). Professor Emeritus of Agnes Scott College, Atlanta/Decatur, Georgia, USA, Dr. McCann obtained a PhD from the University of Chicago Divinity School in 1976 and an STL from the Gregorian University, Rome, Italy, in 1971. He taught business ethics in the United States for over 30 years and has been involved in research, lecturing, and teaching business ethics in China and Southeast Asia for the past 15 years. He is the author of several books and dozens of scholarly articles, most recently, the co-author, with Stephan Rothlin, of International Business Ethics: Focus on China (Springer Verlag, 2015), and the co-author,with Prof. Lee Kam-hon and Ms. Mary Ann Ching Yuen, of Christ and the Business Culture (Chinese University Press of Hong Kong (CRSCS), 2012).

Professor Dr. Arnold T. Monera is currently the Dean of the Faculty of Religious Studies at the University of St. Joseph in Macau where he teaches Scriptures, Biblical Greek, and Theology. He obtained his Ph.D./S.Th.D. from the Catholic University of Leuven (Belgium). For many years he was with the Department of Theology and Religious Education, De La Salle University-Manila. In 2008, he was visiting lecturer at the Graduate School of Philosophy and Religion, Assumption University of Thailand in 2008. His research interests include New Testament Studies and Oriental Religions.

Associate Professor Dr. Pinit Ratanakul is the founding Director of the College of Religious Studies, Mahidol University, he received B.A (Honors) in English from the Faculty of Arts, Chulalongkorn University, and Ph.D. degree in Philosophy from Yale University, USA. He is a distinguished Yale alumnus in Thailand, and is internationally well-known not only as one of the few pioneers, who introduced the discipline of philosophy to the Thai university curriculum. He is also a Buddhist scholar who initiated the study of Bioethics in Thailand and Southeast Asia some thirty years ago, and is, currently, promoting the study and research in the field of Buddhism-Science relations/ dialogue. His research interests include Bioethics; Religion and Science; Religion and Culture; and Religion and Psychology.

Dr. Stephan Rothlin S.J. was born in Zürich, Switzerland in 1959. Throughout his professional life, he has been a transformative force in the field of ethical thought and its application. His approach to ethics is holistic and collaborative, always aiming to synergize our world's cultural and wisdom traditions to discover common principles to work from. Dr. Rothlin his academic studies in 1991 with a PhD in Moral Theology. From 1992 – 1998, he was the Executive Director of the Academic Center (AKI in Zurich) and professor at the Institute of Management and Economics of the University of Zurich in Switzerland. From 1998 - 2005, he served as the Associate Director of The Beijing Center for Chinese Studies in Beijing and guest lecturer at Renmin University, Beijing. From 2005 – 2013, he was the Secretary General of the Center for International Business Ethics and Chairman of the Association of International Business Ethics in Hong Kong. Currently, nhe is the CEO and Founder of

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Dr. R. Jeremy Saul is a lecturer in the College of Religious Studies at Mahidol University, Thailand, where he teaches about religious traditions from South, Southeast, and East Asia in all historical periods. After receiving a BA from Columbia University (East Asian Studies), and an MA from UC Berkeley (Asian Art and Archaeology), he received his PhD from the University of Michigan (Asian Languages and Cultures) in December 2013. Fluent in Thai, Indonesian, and Hindi, and having stayed in Asia for sixteen years, he researches the rise of new devotional movements, particularly in connection with charismatic healers, in both India and Thailand. He is now writing a book manuscript on the rise of devotion to local manifestations of Hanuman and allied deities in northwestern India. At the same time he has started a second research project on Thai healers working as intermediaries for Hindu gods that perform miracles. Recent publications include "When One Hanuman Is Not Another Hanuman: The Case of Salasar Balaji," *Journal of Vaishnava Studies*, 21(1), Fall 2012: 171-186; and "The Kali Yuga as the Era of Wealth-Pursuit: Perceptions of Patronage at a Hindu Shrine," in *Nidan: An International Journal for the Study of Hinduism*, 26(1), July 2014: 88-108.

Dr. Doddy S. Sukadri is presently an Executive Director, Yayasan Mitra Hijau Indonesia (Indonesia Green Partner Foundation), and UN-CC Learn Climate Change Ambassador. He was a negotiator in the climate change conferences, particularly under UNFCCC since 2008-2013. He is the author

of "*Understanding the Climate Change Negotiation: REDD and LULUCF*" (available in Bahasa Indonesia). Doddy is a forest policy analyst, holding a PhD in Forestry from Colorado State University, Fort Collins, USA. He did his Master program at University of Arizona, Tucson, USA, majoring in Forest-watershed Management. His BS, also in Forestry, was obtained from Bogor Agricultural University (IPB), Indonesia. Doddy was the former UN CC Learn National Project Coordinator, and successfully completed the National Learning Strategy to Strengthen Human Resource Capacities and Skills to Advance Green, Low Emission and Climate Resilient Development in Indonesia. He recently completed his two-year appointment as the Co-Chair, Asia Low Emission Development Strategies (LEDS) Partnership.

Professor Dr. Malcolm Wilson was member of the Intergovernmental Panel on Climate Change which received co-awarded the 2007 Nobel Peace Prize with former US vice-president Al Gore. Professor Dr. Malcolm Wilson has played an influential role on the world stage in the research and development of enhanced oil recovery and carbon capture and storage for last thirty plus years. In so doing, he has made Saskatchewan and Canada respected leaders in these fields. In 1998, Professor Malcolm played a significant role in the establishment of the Petroleum Technology Research Centre (PTRC) in Regina. After having served on the board, he became the CEO in January, 2011, retiring in June 2013. He also founded a new PTRC international subsidiary, PI Innovation Centre, in cooperation with a Dutch not-for-profit foundation. He is also Adjunct Professor in the Faculty of Engineering and Applied Science at

the University of Regina, and was appointed Adjunct Professor at the University of Hunan, China, in 2012.

Assistant Professor Dr. Imtiyaz Yusuf is Lecturer and Director of the International Center for Buddhist-Muslim Understanding in the College of Religious Studies at Mahidol University in Thailand. He specializes in Religion with a focus on Islam in Thailand and Southeast Asia and also Muslim-Buddhist dialogue. In 2009-2010, he was visiting Associate Professor and Malaysia Chair of Islam in Southeast Asia at ACMCU, Georgetown University, Washington DC, USA. Dr. Yusuf has contributed to the Oxford Encyclopedia of Islamic World (2009); Oxford Dictionary of Islam (2003); Encyclopedia of Qur'an (2002); and Oxford Encyclopedia of Modern Islamic World (1995). Dr. Yusuf‘s most recent publication are, “Muslim-Buddhist Relations Caught between Nalanda and Pattani” in K.M. de Silva (ed.), *Ethnicity and Conflict in Buddhist Societies in South and Southeast Asia*, (Colombo, Vijitha Yapa, 2015), "Islam and Buddhism: From Coexistence to Dialogue" in Wiley-Blackwell Companion to Interreligious Dialogue Catherine Cornille ed. (Hoboken, NJ: Wiley-Blackwell, In, 2013), Chapter 22. Dr. Yusuf often writes on Islam, religion and Middle East for the Bangkok Post and The Nation (Bangkok).

Preface

Assoc. Prof. Wathinee Boonchalaksi,
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It gives me great pleasure to see this publication from the International Conference on "Ethics, Climate Change and Energy" organized by the College of Religious Studies, the International Center of Buddhist-Muslim Understanding, the Faculty of Environment and Resource Studies, Mahidol University Thailand, the Qatar Red Crescent and the Konrad Adenauer Stiftung, Bangkok. The conference was held on 27-28 November 2014.

The conference exposed the participants firstly to the recent scientific findings on man-made greenhouse effects underlying climate change and energy insecurity; secondly, to the significant contributions of science and technology to energy efficiency and the search for alternative energy resources; and finally, to the concerted efforts of the governments, the private sectors and civic groups in the management of greenhouse effects and in the promotion of responsible energy consumption.

The conference was divided into 4 parts. The first part was the delivery of keynote addresses by Prof. Dr. Malcolm Wilson, a member of the IPCC, and by the Qatar Red Crescent president, Dr. Mohammed bin Ghanem Al Ali Al Maadeed. The second part heard paper presentations by academics on the responses of ethics and religion to the challenge of global warming and by representatives from Thailand, Malaysia, China and Indonesia

on governments' energy policies. The third and a special session was devoted to the presentation of His Majesty's Self-Sufficiency Economy philosophy as a response to carbon pollution and energy management in Thailand. The final session comprised of a panel discussion on visions for the future of mankind and the state of global warming and energy security.

About 200 participants from Thailand and foreign countries comprising of academics, students and general public attended the two-day conference.

Recently, the world leaders met at The 21st United Nations Climate Change Conference (COP21) from 30 November to 11 December 2015 in Paris to address the global challenge of ecological imbalance. Since 1990 and for 25 years the world leaders have met at many climate change conferences organized but not much has been achieved. Only promises were made and intentions to reduce greenhouse emissions were expressed without universal agreements.

Today, Thailand and the world is at a great risk as we experience the effect of global warming and related natural disasters in every part of the globe such as the melting of the ice caps in the north and the south, expanding desertification and rising ocean waters. Everyone is at a risk including all the sentient beings. The world famous naturalist Sir David Attenborough warned that the danger of global warming today vividly clear and cannot be ignored in any way. He called upon the developed and developing nations and all humanity to join in solidarity to address the already here crisis. He remarked, "A lot of the problems will disappear because the oil and the coal which is causing all the problems will remain in the earth where it does no harm at all."[1]

The conference and this publication is the contribution from the College of Religious Studies, the International Center of Buddhist-Muslim Understanding and our partners the Faculty of Environment and Resource Studies, Mahidol University Thailand, the Qatar Red Crescent and the Konrad Adenauer Stiftung, Bangkok towards raising awareness about the challenge of climate change in the Thai academia and the world.

I hope that the research articles in this volume on global warming and on the continuing human efforts to contain it through science, technology, ethics and religion will create a sense of optimism for a sustainable future for humanity and the earth.

Salaya, Nakorn Pathom
Thailand

January 2016

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Ecological Crisis Is A Humanitarian Crisis - Introduction

Imtiyaz Yusuf

"Humans fail to realise that they're part of nature. They can survive and maintain their race throughout the passage of time, simply because of nature's mercy and hospitality. Humans should be grateful to nature. Humans think that they're the master. What we commonly see in this technological-driven era is humans trying to control nature and overly, irresponsibly, and unmindfully exploit it."[1]

Phra Paisal Visalo

Then the LORD God took the man and put him into the garden of Eden to cultivate it and keep it. Genesis 2:15

"And Allah has sent down rain from the sky and given life thereby to the earth after its lifelessness. Indeed in that is a sign for a people who listen." Qur'an, 16:65

"Man is the most insane species. He worships an invisible God and destroys a visible Nature. Unaware that this Nature he's destroying is this God he's worshiping."
— Hubert Reeves - French Canadian astrophysicist and popularizer of science

During the 1960s when climate change was a non-issue, Professor Seyyed Hossein Nasr, the doyen of Islamic Studies, drew the modern world's attention to the relationship between the human being and nature as found in many religious traditions. He raised concerned that the emerging ecological imbalances due to human activities tagged along with the modern ontology of violence and related epistemology was beginning to show its consequences at the cosmic level.[2] Professor Nasr revisited this topic in his 1994 Cadbury Lectures at the University of Birmingham, highlighting the interrelatedness between religions and the order of nature in the main Eastern and Western religions, as well as in the ancient religions of the Greeks and Egyptians, the primal religions of Africa and Oceania, and the Shamanic and American Native traditions. He remarked:

> The Earth is bleeding from wounds inflicted upon it by a humanity no longer in harmony with Heaven and therefore in constant strife with the terrestrial environment. The world of nature is being desecrated and destroyed in an unprecedented manner globally by both those who have secularized the world about them and developed a science and technology capable of destroying nature on an unimaginable scale and by those who still live within a religious universe, even if the mode of destruction of the order of nature by the two groups is both quantitatively and qualitatively different.[3]

Professor Nasr called upon the religious leaders to pay attention to this crucial crisis. Today, nearly a half century later, humanity lives in a state of self-destruction through its destruction of nature.

The yearly catastrophic climatic events around the world, increased human consumption of energy and sprawling urbanization are critically impacting the life connection between humans, all beings and the cosmos.

The 21st century activities for promoting environmentally responsible behavior through "green" activities should not amount to mere commercial gimmicks. Boundless activity that poses a challenge for the climate and energy use has a crucial ethical dimension requiring serious attention for the future of humanity. Since the Industrial Revolution and resulting ecological imbalance, the world has entered an era of climate instability because of the mass burning of coal and other fossil fuels. Moreover, biodiversity is disturbed due to agricultural activities such as farming, raising livestock, fishing, etc. that are directed by the profit motive.

Present scientific knowledge about the state of the environment clearly informs us that humanity has entered into a dangerous bet with the environment, which if not rectified threatens human survival.

Global ecological crisis is affecting all dimensions of life and living. The spread of a consumerist approach to life is contributing to the current devastation of the ecological balance exhibited in exploitative human attitude towards nature rooted in a lifestyle of over-consumption.

The current ecological crisis is a humanitarian crisis. It calls for a responsible and balanced approach to development. The modern triumph of science and technology based on seeking

human dominion over nature has destroyed the environment. It began with a materialist philosophy that underpins every type of modern ideological orientation, whether capitalist or communist. And it seems that the future led by China, India and others will be no different, as the actors change while the materialist philosophical roots remain untouched.

At the 2014 Climate Summit in Peru, Lima, UN Secretary-General Ban Ki-moon appealed to the world leaders "to galvanise and catalyse climate action" by coming up with a meaningful global agreement in 2015 to reduce emissions. The rate of global carbon dioxide emissions has reached a critical level. The United States and China agreed to reduce their greenhouse emissions for the first time, but skeptics point out that the deal is merely another piece of climate change diplomacy, worded in terms of intention rather than action.[4]

The 2014 deal stated that the US intended to reduce its emissions by 26-28 percent from 2005 levels by 2025, and that China intends to achieve peak CO2 emissions around 2030 and increase the share of non-fossil fuels in primary energy consumption to around 20 percent by 2030. Notably, no figure was given for "peak level." Exemplified by the critical state of air pollution in the city of Beijing, China is in fact the world's biggest emitter of greenhouse gases. Meanwhile, the annual toxic haze in Southeast Asia caused by man-made forest fires has made Indonesia the world's fourth largest greenhouse gas emitter, which left a half-a-million people ill in 2015.[5] The populations of rapidly developing India and Myanmar are not immune to air pollution and other environment-related health threats to children and the elderly, resulting in acute and chronic respiratory disease.

The European Union has pledged to reduce greenhouse gas emissions by 40 percent by 2030. However, expressions of intent will change nothing in the absence of action through political will.

At the time of the publication of this book, around the time of the world leaders meeting in Paris on 30th November 2015, it had become abundantly clear that the man-made global ecological imbalance has reached really dangerous levels. In terms of global temperature, 2015 is at the hottest since 1880, when such measurements were first recorded. And all the human and technological attempts have not alleviated the problem. Carbon taxing and other steps taken so far have not changed human behavior which lies at the root of the matter.

A recent article in *The Economist* stated that the 1997 Kyoto protocol died without lament in 2012 due to political-economic reasons. Documents produced at the climate change conferences if not legally binding are cosmetic. "Rather than submitting themselves to caps, most countries now say they intend to reduce, or at least restrain, their own emissions. This fragmented, voluntary approach avoids the debate that had paralyzed climate talks for years, about whether the burden of cutting greenhouse gases should be carried just by the rich world or spread more widely (a debate rendered absurd by the rise of China) ... Outside the oil-rich Middle East, which is mostly ignoring the process, countries are at least thinking about what they could do."[6] In fact, the oil-rich Middle East has never adopted voluntary measures toward climate change alleviation connected with their production and selling policies of oil and gas resources.

All countries today, irrespective of their ideological and religious orientation are guided by the political-economic philosophy of growth and development rooted in a consumerist worldview. Rising Asia and the BRICS (Brazil, Russia, India, China and South Africa) are in no mood to adopt an alternative philosophy or policy toward growth and development. Little attention is paid to the impact of irresponsible growth on ecological balance and bio-diversity at the global level. The question before them is: how can we do it differently?

John Milbank, a founder of the post-modern school of Radical Orthodox Christian theology, views modern materialist philosophy as fundamentally exploitative, nothing less than a violent subjugation of nature via knowledge and research.[7] It employed reason and rationality to justify all-out human control and mastery over nature. This resulted in the current global warming, climate change, tsunamis, typhoons, natural disasters and also socio-economic and ethno-religious conflicts over resources. Development is not shown in the number of high-rise buildings or news cars in a country but in being responsible stewards of the world and its resources.

In her recent book "This Changes Everything: Capitalism vs the Climate," Naomi Klein warned that mere policy changes will not address the challenge of global warming. Instead it requires structural change at the political-economic level or managed growth. She writes: "Our economic system and our planetary system are now at war."[8]

Pope Francis's encyclical "On the Care of Our Common Home" released in June 2015 chided the modern Christians of the North

for misinterpreting Scripture by urging them to "forcefully reject the notion that our being created in God's image and given dominion over the earth justifies absolute domination over other creatures."[9] The Pope linked modern economic driving motives of "need" and "greed" as being a moral dilemma needing urgent attention for it implicates climate change.

The Pope also touched on the issue of (de)carbonization needing urgent attention through joint collaboration of the two main agents in human life viz., science and religion made of deniers and skeptics on both sides. The Pope challenged contemporary ethicists, economists and scientists to come up with a better perspective on the problem of climate change.

In a letter released on 27 October 2015 titled "Buddhist Climate Change Statement to World Leaders," the Dalai Lama and 11 other signatories urged phasing out fossil fuels and called for a movement toward 100 percent use of renewable energy. Through this letter the Buddhist leaders took a united stance on a global issue for the first time. They wrote, "Protecting the planet is a pillar of Buddhism"

> Our concern is founded on the Buddha's realization of dependent co-arising, which interconnects all things in the universe. Understanding this interconnected causality and the consequences of our actions are critical steps in reducing our environmental impact. Cultivating the insight of interbeing and compassion, we will be able to act out of love, not fear, to protect our planet. Buddhist leaders have been speaking about this for decades. However, everyday life can easily lead us to forget that our lives are inextricably interwoven with the natural

> world through every breath we take, the water we drink, and the food we eat. Through our lack of insight, we are destroying the very life support systems that we and all other living beings depend on for survival.[10]

The global "Eco-Muslim" social media movement concerned with environmental protection declared that, "Human beings according to Islam are considered the best of creation. Created from organic materials, Earth, water and infused with the "*fitra*" - a divine inclination - humans are from the Earth. The Earth is a part of ourselves. And it is our responsibility to protect it."

The Eco-Muslim initiative is an eco-jihad effort towards preserving the natural around us and value resources from wherever they are sourced to improve the quality of life for others - people, animals and plants. It engages in activities such as cleaning streets, planting trees and consuming organic items.[11]

In conjunction with other faith communities, a group of Muslim environmentalists, academics and public figures released an "Islamic Declaration on Climate Change" in August 2015 in Istanbul, Turkey. It calls upon Muslims to take ecological responsibility as taught in the Qur'an and to act according to the example of the Prophet Muhammad. The declaration calls for the protection of the rights of all living beings; protection of native plants and wild animals, which are not to be hunted or disturbed; conservation and sustainable use of rangelands, plant cover and wildlife; living a frugal life free of excess and waste; and eating simple healthy food with occasional inclusion of meats, in the example of the Prophet Muhammad as being "a mercy to all beings" as described in the Qur'an (21:107).[12]

An American Muslim environmentalist, Mr. Abdul-Matin, in his book *Green Deen* has revealed the connection between Islamic ethics and environmentalism from the point of view of Islamic religious doctrine.[13]

In 2000, geologists Paul Crutzen and Eugene Stoermer described our era on the earth as the era of the Anthropocene – the human-centered epoch. In this era, the geographic condition has been changed by human activities. It succeeds the currently ending Holocene era that began 10,000 years ago (about 8000 BC) after the glacial period. In the Anthropocene era, "people have become a major geological force. Through mining activities alone, humans move more sediment than all the world's rivers combined. *Homo sapiens* have also warmed the planet, raised sea levels, eroded the ozone layer and acidified the oceans.[14]

Our current ecological predicament requires balancing market-responsive economy with the principle of moral capitalism and the cultural and religious resources found in all the world religions - Hinduism, Buddhism, Christianity, Islam, etc. We need to revisit issues of how biodiversity and ecosystems have shaped human consciousness and behavior; what the beliefs of the world's religions towards living systems are; how religions, governmental departments, educational institutions and the business sector should respond to environmental concerns; how emerging scarcity of natural resources will become the trigger for conflict and violence; and the need for a new understanding of the nature of existence in terms of human-ecology relations.

21st United Nations Climate Change Conference (COP21) 2015 – The Last Hope

The 21st United Nations Climate Change Conference (COP21) from 30 November to 11 December 2015 in Le Bourget, France, was described by Hollywood star Sean Penn as the "last great chance" to stop the planet overheating. At the previous 2014 Climate Change Conferences in Lima, Peru, the countries were called to express their Intended Nationally Determined Contributions (INDCs) towards reducing greenhouse gas emissions for consideration before COP21. A rise in temperature of more than 2°C will have serious consequences causing extreme climatic events. The question before humanity today is: "do or die." The conference addressed critical questions about:

- How have biodiversity and ecosystems shaped human consciousness and behavior;
- What are the beliefs of world's religions towards living systems i.e. how has understanding or misunderstanding of religions shaped human lifestyle and behavior;
- How should religions, governmental departments, educational institutions and the business sector respond to environmental concerns;
- How will the emerging scarcity of natural resources become a trigger for conflict and violence between human societies;
- How can study and research in the scientific, business and commercial fields be integrated with nature-related ethics;
- The need for new ontologies of non-violence to shape human-biodiversity relation.

It called on the well-off nations and oil-producing states to:

- Lead the way in phasing out their greenhouse gas emissions as early as possible and no later than the middle of the century;
- Provide generous financial and technical support to the less well-off to achieve a phase-out of greenhouse gases as early as possible;
- Recognize the moral obligation to reduce consumption so that the poor may benefit from what is left of the earth's non-renewable resources;
- Stay within the '2 degree' limit or preferably within the '1.5 degree' limit, bearing in mind that two-thirds of the earth's proven fossil fuel reserves remain in the ground;
- Re-focus their concerns from unethical profit from the environment to that of preserving it and elevating the condition of the world's poor.
- Invest in the creation of a green economy.[15]

At the time of writing this introduction in December 2015 during the Paris climate change summit, ministers from 200 countries had agreed on draft agreement to limit global warming but failed to agree on taking major policy decision disputes that divide the developed and developing countries concerning rising oceans, forests, water, energy resources and limiting the rise of global temperature to less than two degrees Celsius as a common stance for all countries. A challenge before USA, China and India whose industries, etc. release about half of the world's emissions of carbon dioxide – the gas that traps heat in the atmosphere and is the main cause of global warming. A major sticking point was about developed countries offering financial assistance to developing countries to limit their emissions.[16]

The success of the Paris agreement will be possible only if it is implemented as a global political legal agreement. A non-binding directive will change nothing. The USA, EU, China and India have to take this seriously as it is a critical matter affecting all the species on the earth with very important cosmological implications.

The climate change issue is a multi-dimensional challenge to the core of our being. The question is whether humanity is ready to accept it or else destroy itself through its inhumanity towards its own species, other beings and elements in nature?[17]

Contributions in this Book

Global warming has placed us at a crossroads. As citizens of the world we can either continue seeking uncontrolled growth or we can take a different direction. At best, at the individual level the adoption of a few effective habits such as reducing the use of plastic bags, recycling, limiting the number of brightly lit signboards at street corners, teaching climate consciousness in schools, turning off lights in school toilets and offices when not in use, etc - will be a small contribution to this gigantic global responsibility.

Promotion of environmentally responsible behavior among the public should not be a mere commercial gimmick. It needs serious attention. It concerns our stewardship of a “silent” natural world whose suffering is going largely unnoticed. The world has entered an era of climate instability and ecological imbalance, but there is still a window for optimism that we can reverse this |crisis before it is too late.

The articles in this book are drawn from the International Conference on "Ethics, Climate Change and Energy" held on 27-28 November 2014 at the College of Religious Studies (CRS), Salaya, Thailand. The conference, attended by international experts in the study of the environment, religion and ethics, was a activity of cooperation among the following partners: the CRS International Center for Buddhist-Muslim Understanding; Faculty of Environment and Resource Studies, Mahidol University; Qatar Red Crescent; and Konrad-Adenauer Stiftung, Bangkok, Thailand. It was a collaboration among practitioners of science and religion in both academic and practical ways as they impact life and thought. The articles by Richard Foltz, Pinit Ratanakul and Arnold Monera are additional contributions to this volume.

Richard Foltz states that global violence is violence against the Earth's life-support systems, what we typically refer to as the environment. Environmental degradation is directly linked to other forms of violence such as war, poverty and oppression.

Malcolm Wilson is a member of the Intergovernmental Panel on Climate Change, which was co-awarded the 2007 Nobel Peace Prize with former US vice-president Al Gore. Prof. Wilson's paper provides an overview of some of the technologies available to the world to reduce the impact of climate change by slowing the rate of growth of the concentration of greenhouse gases in the atmosphere.

Mohammed Ghanim Al-Ali Al-Maadheed, president of the Qatar Red Crescent, discusses the impact of ecological events on the living conditions and survival of vulnerable communities

as a cause for global concern. He highlights the role played by the Red Cross and Red Crescent (RCRC) in providing humanitarian aid and support to areas affected by climate change and disasters.

Pinit Ratanakul, founder and senior advisor to the College of Religious Studies, Mahidol University, delves on the principles of Buddhist environmental ethics. Stressing on the importance of the Buddhist religious concepts of interdependence, compassion and the Middle Way assists in avoiding the extremes of excessive anthropocentrism and naïve biocentrism. In this way, the Buddhist ethics sets limits of ecological intervention which needs to be corrected by right view of reality.

Osman Bakar, a Muslim philosopher of science, discusses Qur'anic teachings and perspectives about the earth as a human home that carries observance of special features and conditions. The damaging of the home earth by its human occupants is the root cause of the modern ecological crisis, and this needs real solutions to the crisis.

As a Christian theologian, Arnold T. Monera discusses the ecological crisis as a moral and religious issue. He calls upon Catholics as the largest Christian group to recognize a relationship between their faith and the future of the planet – a movement for 'Greening' of Christianity

Stephan A. Rothlin and Dennis P. McCann discuss the challenges before us and our role as responsible global citizens in addressing shared concerns about the environment, as well as the need to convince people to build a sustainable environment.

Insan Kamil Al Batanji and Doddy S. Sukadri from Indonesia highlight the connection between nature and humans, and the need to practice Qur'anic ethics for the conservation of nature.

Ven. Santussika Bhikkhuni discusses the role faith leaders can play in mobilizing people's climate movement as a process of empowerment for the protection of nature.

R. Jeremy Saul's paper offers reflections on Hindu Ecology. The Hindu view sees no division between God and creation -- Brahman-Atman unity is presented as divinized universe. He demonstrates how this formulation intersects with the notion that the Hindu cosmos is a unit of devotion but which can result in dangerous chaos if not attended to rightly.

The conference called for changing the format of the religious, educational, commercial and political landscapes for the preservation of nature and humanity. It exposed the participants and the public to recent scientific findings on climate change and energy insecurity, and the threat to the survival of life and the Earth. It encouraged joining in global practical initiatives towards restraining the consumption of energy resources to bring greenhouse emission under control.

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The Environmental Crisis and Global Violence: A Matter of Misplaced Values

Richard Foltz

Introduction

As the Iranian philosopher Seyyed Hossein Nasr observed half-a-century ago, long before most people realized the extent of damage human activities were doing to the Earth's life support systems, the environmental crisis is fundamentally a crisis in values. In other words, we have been behaving in ways which show a marked lack of awareness and appreciation for the very ecosystems which make our own survival possible, indicating that we do not value them as we should. In fact, we are, as Stanford biologist Paul Ehrlich describes it, vigorously sawing off the very branch we are sitting on, thinking only of how much we can sell it for as firewood. *Yekī bar sar-e shākh bon mīborīd, Khodāvand-e bostān nazar kard va dīd.*

Indeed, we have made buying, selling and consuming into values unto themselves, into ends rather than means, and we have allowed every last thing in our universe, even love itself and some would say religion as well, to be reduced to mere commodities to be thrown at the mercy of the Market. Day in and day out we hear ourselves referred to as "consumers," which has become our primary identity, and we accept this without protest. We allow decisions to be made on no other basis than the maximizing of profits for those fortunate or ambitious enough to control something they can profit from, even though the benefit

rarely if ever reaches most of us, and even though the costs of these decisions are passed onto those least able to bear them. What kind of value system allows us to make such choices?

The primary source of values in any society is religion, and this is inescapable. Even atheists cannot live outside the framework of their culture in which they have been immersed since birth. (This is why Marxism is sometimes referred to as a Judeo-Christian heresy, since its starting point was the mindset and worldview of Christian Europe.) Most people are not atheists, but they often find ways of interpreting their received religious values in ways which can seem to support whatever agenda they happen to be pursuing. In such cases values can appear to have been greatly distorted when compared to earlier interpretations. Sadly, one result of such distortions is often violence.

Violence Against the Earth

The most pervasive and dangerous form of global violence today is violence against the Earth's life-support systems, what we typically refer to as the environment. Environmental degradation is directly linked to other forms of violence such as war, poverty and oppression, though these linkages are often obscured by political and other factors, and sometimes deliberately so. To paraphrase Paul Ehrlich again, those who understand our dependence on ecosystems realize that the environmental crisis is the shaky stage on which all other human dramas are being played out — if the stage crumbles, none of the rest will matter. To cite another image used by environmentalists, the various human struggles we see around the world today are like fighting over possession of deck chairs

on the Titanic. Yet we persist in treating the environmental crisis as merely one issue among many, rather than as the central issue that it is. How can we deceive ourselves so? We seem capable only of perceiving threats assaulting us head-on, failing to notice the far greater threat right under our feet. Perhaps, distracted by the need to dodge punches aimed at our faces and bodies, we are unable to see the fault lines we're standing on which are beginning to crack.

We worry a lot about bombs, but we should be a lot more worried about water. Water is so vital to life that even the richest of the rich cannot live without it. We will die from lack of water before we will die from lack of anything else. If our Palestinian and Lebanese brothers and sisters have been living in mortal danger from military incursions into their lands, a far greater danger is posed by the siphoning off of groundwater from the West Bank to fill Israeli swimming pools.

Even in my home country of Canada, which possesses the largest freshwater reserves on the planet, repeated droughts in the Western provinces suggest that something is not right with the way we are doing business. What then can we say about Sudan, Niger or India? Worldwide, a third of the total human population lives in daily deprivation of access to that most vital of all resources, water. What greater violence can there be than inflicting the unbearable and ultimately fatal torture of unabated thirst?

Of course we have also commoditized the soil, and now, with sellable pollution permits, the air we breathe as well. Wherever there is commodification we can see the same result: a commodity

is valued only to the extent that people are willing and able to pay for it. Economists today speak quite openly and unashamedly about the need for people to be willing to pay for clean air. Within the current value system, air, water and soil pollution are actually good things, because cleaning them up and treating the illnesses they cause are activities that boost the GNP, that obscene measurement which sees all forms of economic activity as being positive, failing to differentiate between healthy versus unhealthy activities, just as it fails to take note of who actually benefits or who suffers as a result of these economic transactions.

Again, the question must be asked, what value system has allowed, even encouraged us to make these choices? Where are our traditional value systems in all this? Have the religions of the world nothing to say? Unfortunately it would seem that most people today have failed to note the emergence of a new, global Religion of the Market which has superseded all other value systems by winning more converts in a shorter period of time than any religion in history. Its success has been assured through the unchallenged ability of transnational corporations to arrogate unto themselves virtually all of the world's power and wealth, with the connivance of increasingly subservient national governments. The fact that a large proportion of these corporations and their leaders are based in the US should not mislead us into imagining that the US itself is the dominant power today, for Americans and even the American government have become hostages to corporate power which has no fixed home and no loyalties. Power and wealth today are mostly in the hands of a transnational elite that is truly global; whatever country they may actually live in, today's decision-makers share

the interests of their own international class and not with the people of any nation. Whatever cultural affiliation they may pretend to claim, in fact the Religion of the Market is their only true ideology.

Globalization and the Religion of the Market

How then has the Religion of the Market achieved such success at the popular level? This has been done through a massive global propaganda campaign funded by these same corporate powers and their government lackeys, and spread through the missionary apparatus of highly-paid advertising agencies and public-relations firms making false promises of benefits for all. The priests of this new global religion are the so-called neoclassical economists of the Chicago school, whose mumbo-jumbo formulas nobody understands but whom we all trust to instruct us in the proper ritual behavior so as to appease our Market God. Our places of worship are the shopping centers, where we carry out our ritual obligations to consume as much as we possibly can in the hope and belief that this will bring us some kind of unspecified salvation. We are told that the juggernaut of economic globalization is unstoppable, inevitable, and that it will benefit everyone, but also that we must accept these claims *on faith alone*. In fact the evidence is clear that the Religion of the Market works against the interests of the vast majority of people on this earth, but anyone who attempts to point this out is massively shouted down as a heretic.

The Gospel of Globalization succeeds in winning converts not because it is true but simply because it is louder than any other

voice in the world today, its megaphones provided by a global media almost entirely in the hands of its corporate champions. The supposed universal validity of this new religion is demonstrated by the fact that it has been embraced by people from all over the planet — Christian, Jew, Muslim, Hindu, and Buddhist — as well as by so-called "secular humanists." Like the universal faith systems of the past, the Religion of the Market succeeds by claiming to be either compatible with or superior to people's existing faith systems. Thus, alongside those abject materialists who claim to have abandoned religion altogether we also have Christians who believe that if Jesus were alive today he'd drive an SUV and Muslims who believe that ostentatious wealth is a sign of Allah's special favor, Hindus who live as if Lakshmi were the only one of their 33 million deities that mattered, and Buddhists spending millions building high-rise nirvanas out of glass and steel.

And yet, because not everyone on Earth has agreed to join this new faith, the Religion of the Market imposes itself all too often through violence, whether in the form of riot squads breaking up peaceful demonstrations in the West or endless military occupations meant to ensure an entire country gets put out for sale to foreign investors. For the most part the victims of this violence are simply dismissed, using appropriately military terminology, as "collateral damage." You can't make an omelet without breaking some eggs, and anyway, the subtext reads, mostly such people are infidels who don't believe in the Market God. What is rarely acknowledged or admitted is that sooner or later, this violence threatens all of us, faithful and unfaithful alike: the Religion of the Market, the religion of boundless consumption, is a mother who eats her babies.

Given the righteous and uncompromising fervor through which the Religion of the Market is propagated by its supporters, is it any surprise that resistance to this hegemonic faith system often articulates itself in religious terms? Islamic jihad is but one form of expression, conjuring Muslims' life-or-death struggles of centuries past: in India we have the Chipko "tree-hugging" movement, rich in Hindu imagery and vocabulary, and in Thailand Buddhist monks are performing ordination ceremonies on trees to protect them from being treated as mere commodities. In sub-Saharan Africa, the Earth keeping churches blend a liberation theology-tinged Christian message with ancient animist reverence for nature.

But one wonders whether in most cases the resistors have really understood the true nature of their enemy. It is not a question of resisting modernity, technology, globalization or "progress" as such, for all of these terms have a range of possible meanings and applications. I think what people are resisting is really the imposition of an alien faith system which they intuitively sense sees them only as offerings to be sacrificed at the altar of the wealthy and powerful. Mostly I suspect this awareness is subconscious at best, and perhaps that is why global resistance to the Religion of the Market is floundering. People cannot effectively fight an enemy without first accurately identifying who, what or where that enemy is.

In Middle Eastern cultures the most significant factor informing received value systems is Islam. Thus, for Muslims who do not accept the imposition of the Religion of the Market as a substitute for their traditional value system, a reaffirmation of Islamic values is the often most natural form of resistance. But a resistance to

the Religion of the Market which hopes to be informed by Islam cannot expect to find a ready-made response in the experiences of the Muslim past. Islamic values and experiences must be interpreted in light of the present challenge, and to date few Muslims have had sufficient understanding either of the Religion of the Market or of the global environmental crisis to enable them to do this.

Among those who have, we have already cited Hossein Nasr who has argued since the 1950s that Islamic science and technology never lost sight of the sacredness of Creation as occurred in the West. More recently we have seen interpretations such as those found in the book *Islam and Ecology* which we edited in 2003, particularly the environmentally-focused Qur'anic exegesis of Prof. Ibrahim Ozdemir, and the economic critiques of Fazlun Khalid and Prof. Yasin Dutton, which link un-Islamic banking practices with unsustainable development. The past decade has seen a flourishing throughout the Muslim world of environmental organizations which seek to apply an Islamic understanding of environmental ethics, and many of these organizations have emerged right here in Iran.

Yet for the most part, it must be admitted that for most of the world's Muslims today, as for people everywhere, environmental concerns are not seen as central. At best, they may be included within a litany of other problems and injustices, many of which are accorded equal or greater weight. This is a misperception and a mistake. Our very survival as a species is in jeopardy. At best, it is virtually certain that our children and grandchildren will inherit from us an impoverished and diminished planet, due to our own arrogant refusal to respect and abide by the laws of nature. At worst, they may inherit nothing at all.

In repeatedly choosing to value the interests of the immediate present over those of the future and the interests of rich elites over those of the vast majority who are poor, we are faithfully following the logic and dictates of the Religion of the Market, but we are also violating natural constraints laid down since the time the Earth was created, and our children will pay the penalty for our criminal negligence. Whether Muslim, Christian, Jewish, Hindu, Buddhist or secularist, we have whether wittingly or not allowed ourselves to live and act as members of a faith which believes only in consuming as much as we can as fast as we can (what economists call "efficiency") without regard for the consequences to others or to ourselves.

Conclusion

In a world where human numbers and human desires seem to be increasing without restraint, the finite resources of our common earthly home seem destined for the hands of those who remain bent on taking all they can, whether by persuasion or by force. The ultimate source of violence, and of environmental degradation as well, is greed. The Religion of the Market, which has made greed into a virtue, is thus a religion of violence. If we recognize this fact and oppose the spread of this religion of death, we may yet find the way (or the way back) to a value system in which natural limits are recognized and resources are distributed equitably, and where those who would use violence to take more than their share are condemned as outcasts instead of being celebrated as heroes.

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Energy Production and Use in a Carbon Conscious World

Malcolm Wilson

Author's note: This is an editorial style rendition of my presentation at the conference. There will be few sources referenced quite deliberately in order to allow for a personal expression of opinion on a complex, but interesting and all important topic. The overall question raised by the title of the conference was, itself, a challenging topic to consider and review from the perspective of some of the technological pathways to reduce emissions to the atmosphere and slow the rate of change of the climate (there is, in my opinion, no way to reverse changes that we are already committed to as a result of our massive experiment with changing atmospheric chemistry). Beyond some introductory comments, I felt that the reason for this presentation was to provide some technological background rather than comment on the ethics of the use of these technologies. I hope these views and the outcomes of the conference as a whole will provide for further debate and help ensure that technology is introduced in an ethical manner. I do thank the conference organizers for the opportunity to speak and to give my viewpoints.

Introduction

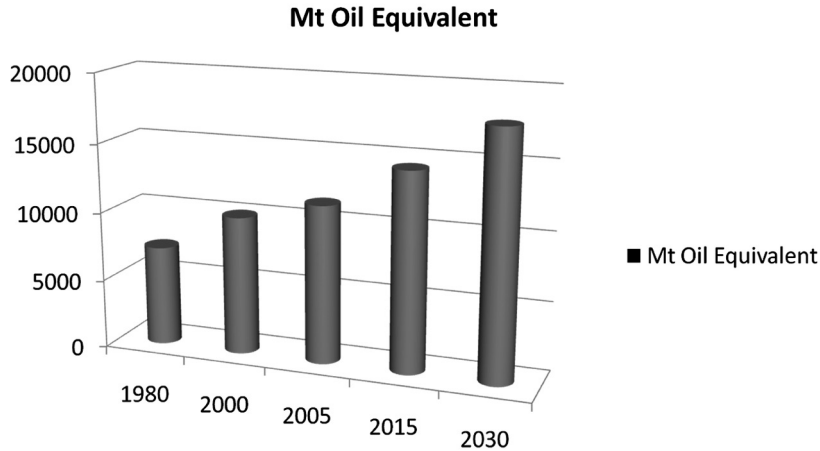
There are many papers on the impacts of climate change in the literature, both scientific and popular. In spite of this, it is worth making a few comments about the vulnerability of humans, as well as ecosystems, as climate conditions change. It has been

estimated that we could see as many as 200 million displaced persons (environmental refugees) by 2050 as a result of drought, coastal flooding and a lack of clean water for drinking. This will occur from an increase in storm events in coastal regions, melting glaciers and other factors that will cause problems with agriculture and food production. As we observe sea level rise, so the risk of infiltration of sea water into coastal aquifers will also be a problem. This will only compound an already disturbing statistic that over 20% of the people in Africa and Asia are undernourished (FAQ 2006). Many of the nations that will be hardest hit will be those with the fewest resources to deal with the problem.

I feel that Marshall McLuhan (1911 – 1980), a Canadian philosopher of communication theory, said it best in one of his famous comments: "There are no passengers on spaceship earth. We are all crew." This brief quote captures the essence of the problem -- we cannot leave and look for another home, we are alone on this sphere orbiting the sun and we have to take care of this home. To date we have done a less than stellar job and now we have entered into a massive global experiment, albeit unwittingly, to change the chemistry of the atmosphere and see what impacts this will have on the climate, oceans and human and natural ecosystems.

Based on the findings of the IPCC (Intergovernmental Panel on Climate Change), if we do not moderate our use of fossil fuels or reduce the growth of the atmospheric concentration of greenhouse gases in some way, global temperature changes in the order of 3.7 to 4.8^{o}C by 2100 can be expected (IPCC Fifth Assessment Report). This is well above the 2^{o}C that scientists

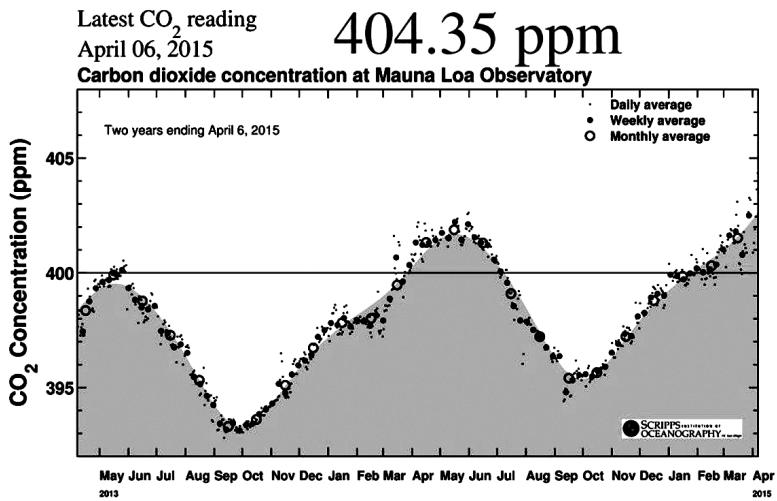
are arguing will be unlikely to result in catastrophic change. This is based on global population increase and continuing economic growth, using current models of that economic growth. That we have already embarked on change is unequivocal. "Since the 1950's many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen." (IPCC Fifth Assessment Report). One prediction of energy demand growth is given by this University of Regina graph:



Compounding this is the fact that we are being forced to use increasingly lower grades of resource. In the case of oil, the US EPA estimates that oil sands produce oil that is between 8 and 37% more carbon intensive than a conventional barrel of crude. In the case of Thailand, the US Energy Information Administration showed a steady increase in crude utilization from 1990 to 2011 of 150%, with only a stabilization from 2011 to 2013.

The issue we have to face as "global citizens" is that, within the context of a growing population, we have to strive for an increase in the standard of living of the poorest of our citizens. People deserve access to energy to accomplish a rise in living standards. The question is: "Do we all need to use the same amount of energy as people in Canada for example?"

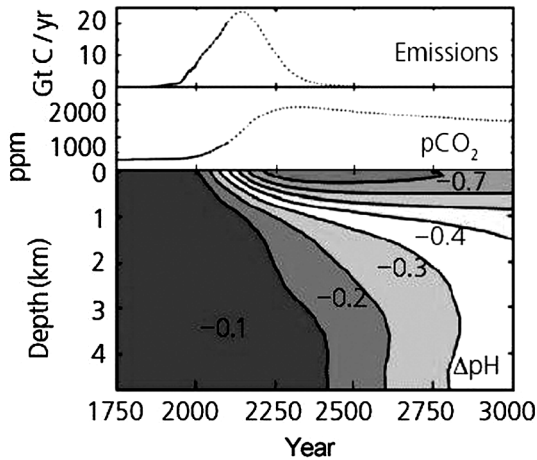
To put this in context, it is worth looking at several graphs. The first is the Keeling Curve, a graph of the atmospheric concentration of CO_2 measured from Hawaii by the Scripps Institution of Oceanography:



In this chart we can see, if we look at the troughs or peaks, an annual increase in CO_2 concentration of around 2 ppm per year. Remember this is only CO_2. When the other greenhouse gases are included in the total, we sit at around 480 ppm CO_2e (Prinn

from MIT in June 2013 http://oceans.mit.edu/featured-stories/5-questions-mits-ron-prinn-400-ppm-threshold). This places us above the limits suggested by the IPCC of 450 ppm CO_2e and suggests ongoing change.

The atmospheric increase in CO_2 does not account for all of the excess CO_2 (outside the natural CO_2 cycle) that enters the atmosphere. With an increasing partial pressure of CO_2 in the atmosphere, there is an increased uptake by the oceans. This leads inevitably to an increase in the acidity of the oceans as the following graph from (Caldeira&Wickett, 2003) shows:



This acidification, if left unchecked, could dramatically alter the diversity and makeup of the planktonic micro-organisms that form the base of the marine food chain, resulting in serious impacts on the ability of the oceans to produce food.

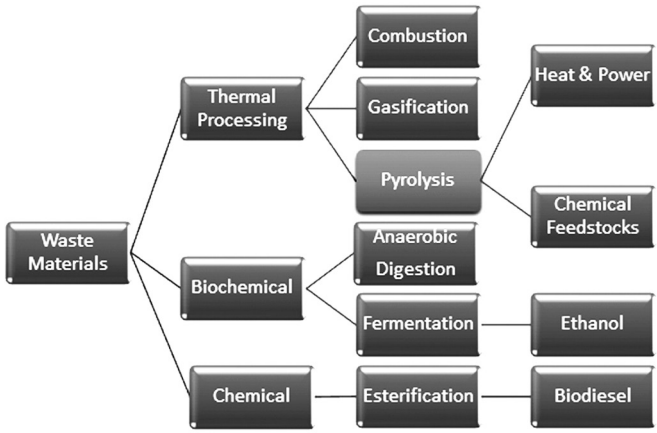
Some Energy Solutions

Many countries, with Thailand as an example, use biomass as an energy source. At one level this is a good thing to do. The argument is that biomass will reproduce itself and the impact of the carbon released to the atmosphere will be zero. This has certain limitations, however. With a growing global population, there will be a continuing need to grow more food to meet the needs of this population. The shift of food crops (direct human consumption or animal feed) increases competition for scarce resources and increases prices, something the wealthy can accommodate but not the countries where the need is greatest. Additionally, as we utilize resources from rain forests, our overall biodiversity is negatively impacted. Finally, an increase in the use of biomass is often associated with the need to increase soil fertilization, which means that the consumption of biomass is not truly carbon neutral. We need to find ways to use more by-products from food production and find alternatives for the maintenance of soil fertility.

As noted in the title of this section, the intent is to examine selected options available to us to combat climate change, not to provide an exhaustive list. This is illustrative only.

In the first case, the use of biomass (in the form of agricultural residues, energy crops, municipal waste, etc.) to create energy can be accomplished in a number of ways:

1. Pyrolysis of Biomass:



This chart shows routes to an energy output through thermal processing, biologic action and chemical treatment. The focus is on the use of pyrolysis as one of the more flexible alternatives. In this process, the organic material is thermally degraded in the absence of air into several components – water, a syn-gas stream, a bio-oil stream and biochar. The gas stream can be used to provide the external heat source to the chamber in which the organic material is degraded. The bio-oil can be used as a fuel oil replacement or to generate electricity. The biochar (essentially charcoal) can be used to produce more electricity (burned in a boiler) or as a soil enhancer with the benefits of improved soil quality, improving retention of fertilizer and moisture and as a way of sequestering carbon for long periods of time. *Terra preta* (Portuguese for "black earth") is present in the Amazon Basin as a result of anthropogenic activity incorporating charcoal or biochar into the native soils. The important point here is that the carbon is still present to some level after a thousand years or

more. The sequestration of carbon as biochar is similarly effective to geologic storage when considered in terms of centuries. Not all biochar can be used for soil enhancement; in some the trace elements may be such that combustion is the only useful way to consume the biochar.

The advantage of pyrolysis and many of the above systems is that 70-85% of municipal solid waste can be diverted from landfills and distributed generation of electricity can be undertaken. There are numerous benefits to distributed generation in terms of financial outlay and jobs created.

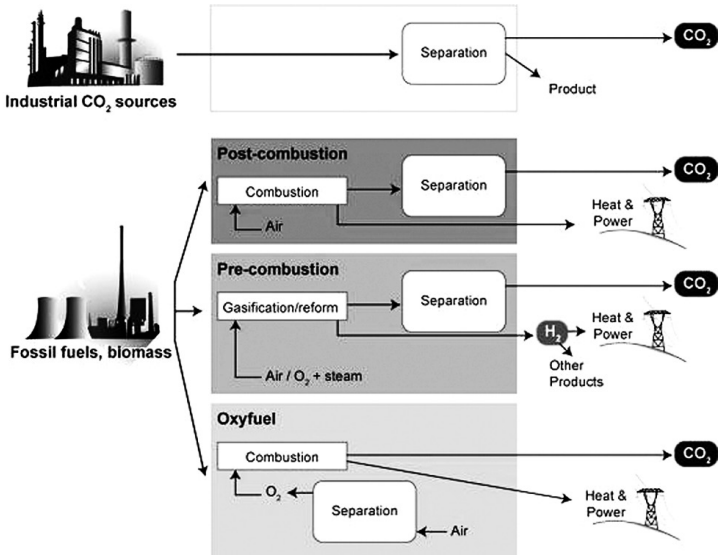
2. Carbon Capture and Storage

The second technology that I wish to discuss is the capture and storage in the subsurface (geological storage) of carbon dioxide (CO_2 or "carbon storage" when considered in a geological context). The use of biomass is a way to avoid the use of fossil fuels, in the same way that wind or solar production do, but the question is: "Can we generate enough electricity economically to meet our growing needs with renewable energy sources?" The answer is not straightforward, although it would seem that at least in terms of the coming decades this will not be possible. As a result, we will need to look at ways to reduce the emission of CO_2 to the atmosphere from fossil fuels by means of carbon capture and storage or CCS.

CCS is effectively the capture of CO_2 from the exhaust streams of processes designed to use fossil fuels,principally natural gas and coal. Many industrial processes, such as the cleaning of natural gas streams or the production of nitrogen-based fertilizers,

produce a pure stream of CO_2 that can be compressed and moved in a pipeline with little additional processing. An example of this is the by-product stream of CO_2 from the Dakota Gasification facility in North Dakota, USA, which is utilized in Saskatchewan, Canada, for enhanced oil recovery (a process by which incremental oil is produced from the subsurface, but the CO_2 will remain buried in the deep subsurface indefinitely).

In other processes, such as the combustion of coal to form electricity, the CO_2 must be concentrated prior to use or storage. With nitrogen being the primary component of air,any exhaust gas from fossil fuel combustion is dominantly nitrogen. To try to compress this and store it in the subsurface would be prohibitively expensive and would probably exceed our capacity for subsurface storage. As a result, the processing removes the nitrogen either before combustion or after combustion ,as shown in the cartoon below (from Sally Benson, Stanford University):

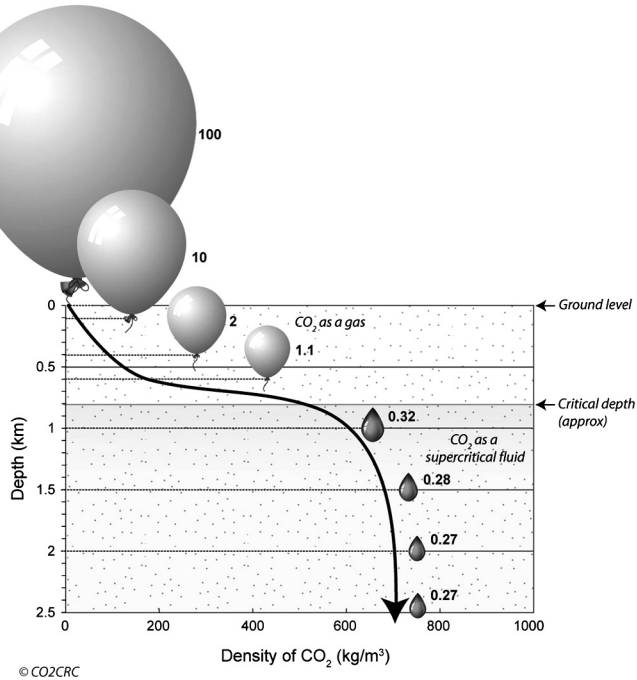


An example of this is shown in the photograph below. It is the world's first commercial demonstration of CO_2 capture from a coal fired electrical generating station in Saskatchewan, Canada. The photograph, courtesy of SaskPower, a utility, shows the generating station on the left and the capture plant on the right.

The SaskPower facility captures some 3,000 tonnes per day (the equivalent of 150 MW of electrical generation) and sends it to an enhanced oil recovery field. While this appears to be an expensive way of avoiding CO_2 emissions, it captures large amounts of CO_2 and is actually cheaper than many alternative reduction schemes. Indeed, in a number of publications and presentations, the International Energy Agency has indicated that the cost of significant reductions in CO_2 emissions by 2050 would be much higher if CCS were not utilized.

The above discussion talks about the capture of the CO_2 or the prevention of this CO_2 reaching the atmosphere. Once captured, something must be done with it. The CO_2 is compressed and piped to its destination. Compression is an essential step to

reduce the volume of the CO_2 and allow it to be pumped into the ground. The following diagram demonstrates the 400x reduction in volume from CO_2 at atmospheric pressure to a liquid/supercritical fluid for storage. This diagram is courtesy the CO2CRC in Australia:



One inevitable question is the safety of injecting a gas,that could asphyxiate in high concentrations, into the ground. Will this CO_2 return to the surface and harm people? There are certainly examples of asphyxiation of people in confined spaces where the CO_2 concentration can build up (CO_2 is heavier than air, so in enclosed locations where the wind will not disperse the CO_2, concentrations can increase). In one classic example, teenagers entering an old coal mine in Saskatchewan several decades ago

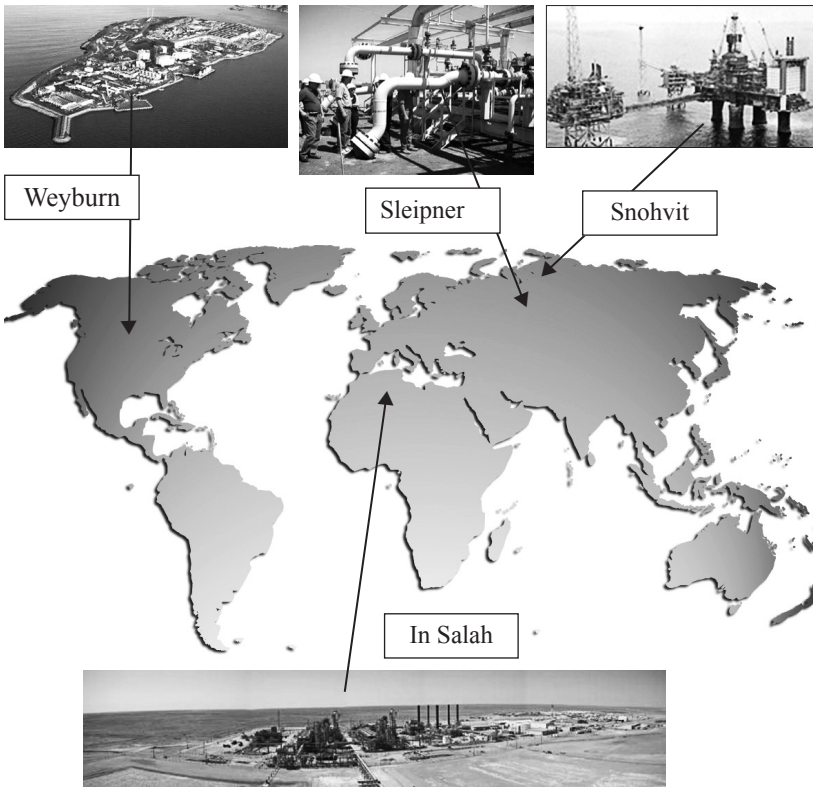
were asphyxiated due to the CO_2 build up in the mine. However, a properly designed storage facility is unlikely to leak. There are a number of well-defined natural processes that will help to keep the CO_2 in place and eventually eliminate the potential for leakage.

The first line of defense is the presence of layers in the subsurface that are effectively impermeable to fluid movement that will prevent the CO_2 from migrating upwards from the injection horizon to the surface should the CO_2 leak from its original injection layer. This is termed physical trapping. Over time, the CO_2 will dissolve in the salty water in the zone into which it is injected. When this happens, the density of the saline water increases and the natural buoyancy of the CO_2 is eliminated. In addition, the CO_2 in the rock becomes disaggregated in the microscopic pores in the rock and is immobilized, this is termed trapping by capillary forces. Finally, over very long periods of time (millennia) some or all of the CO_2 will react with minerals in the rock and precipitate as carbonate minerals. At this stage there is no possibility for the CO_2 to move.

Could a storage facility or an enhanced oil recovery project leak? While unlikely, there is a possibility and this has been evaluated on numerous occasions by the research community. Leakage pathways might be missed by even the most careful of pre-injection surveys. However, leaks are likely to be small and, if not trapped in a confined space, will be harmless, as is seen with many volcanically sourced natural leaks to surface. Many of these leaks have been carefully examined by diverse researchers and the limited impact determined. The most likely route to surface for CO_2 will be old wells that may have degraded

or perhaps been poorly abandoned. Careful examination of records and the possibility of pre-emptive working of the well or wells would eliminate the problem. Certainly, the oil and gas industry is very adept at reworking wells to prevent problems – while old wells are the most likely source of risk, they are also the easiest to deal with using current technology.

There are a number of well monitored storage locations in the world. The following map shows the four key locations globally with the images provided by BP, Statoil and PTRC:



In spite of extensive monitoring, none of these sites has shown any leakage in spite of millions of tonnes of CO_2 being injected. In the case of the Sleipner injection site, it has been in existence for almost 20 years.

Of the four sites shown above, the Weyburn site is the only Enhanced Oil Recovery site. Because of the availability of information on the site that is in the public domain, this is perhaps the best understood reservoir globally. Currently, approximately 6,500 tonnes per day of CO_2 is purchased and injected along with 6,500 tonnes of recycled CO_2 per day (while CO_2 is returned to surface with the produced oil, it is captured, recompressed and re-injected into the oil reservoir, a closed loop system). The purchased CO_2 comes from an industrial site 320 km away in North Dakota, USA, and is entirely anthropogenic CO_2.

Even in a site with numerous oil wells penetrating the injection zone, some of them 50 years old or more, extensive study has shown that the risk of leakage to surface is very small indeed. Not only do we have a reservoir that has contained oil and gas for some 50 million years or so, there is a geology that offers a number of safeguards should CO_2 escape from the primary injection zone, the oil reservoir. The "layer cake" nature of the sedimentary beds in Saskatchewan provide a number of protective zones of impermeable rocks above the oil zone. These zones would provide an excellent means of preventing the rise of buoyant CO_2 to the surface or to potable groundwater zones.

Other issues

In addition to extensive research on geological storage into both storage sites and enhanced oil recovery sites, there is work underway to provide guidance on the activity of CCS. In Canada and the US, the Canadian Standards Association developed a set of voluntary standards for the geological storage of CO_2 (CSA Z741), which was released in 2012.

This Canadian standard was used to initiate the development of a set of international CCS voluntary standards through the International Standards Organisation or ISO. The work is underway on standards for capture, transport and storage, and these standards will become public as they are completed. This work is under ISO TC265 and information on progress is available through the ISO website.

Standards, while they are voluntary, can be placed into regulation by recognition of the competent national or sub-national authorities in countries where activity can occur. They provide the guidance required to undertake these activities in a safe and environmentally friendly manner.

Conclusions

This was a very brief attempt to provide an overview of some of the technologies available to the world to reduce the impact of climate change by slowing the rate of growth of the concentration of greenhouse gases in the atmosphere. This was not, nor was it intended to be, an exhaustive discussion. It looked at only two mechanisms: biomass and reducing the impact of ongoing

fossil fuel use. The world will need to use these and all other mechanisms available to begin mitigating the impacts of the grand experiment of changing atmospheric chemistry. That we are destined to experience the effects of change for centuries, even if by some miracle we were able to stop emitting greenhouse gases tomorrow, is certain. It does not absolve us of the necessity to prevent change from becoming catastrophic. We have an obligation to ensure that we pass on to our children and grandchildren a useable world. We cannot assume that they will have the resources to deal with the legacy we and our parents are leaving.

There had been talk prior to my presentation of the concept of geo-engineering. This became more of a "mainstream" discussion quite recently in the US (New York Times articles for example). Fortunately, there was a recognition that such activity should only be a "Plan B" in the event of a failure to meet the goals of emissions reductions prescribed by the IPCC and other august scientific bodies. As I have mentioned, we have already entered into a grand global experiment and using other grand experiments to modify changes we have initiated in the atmosphere incurs yet more risk. Our history with acid rain and ozone depletion suggests that, with effort, we will be able to reduce our emissions to the atmosphere with known technology, and without resorting to technology to modify our atmosphere.

Our research and activities, such as standards development, suggest that we can develop and implement the technology required to reduce our emissions to the atmosphere of greenhouse gases and that we can do this in an environmentally friendly and safe manner.

Humanitarian Impact Of Climate Change

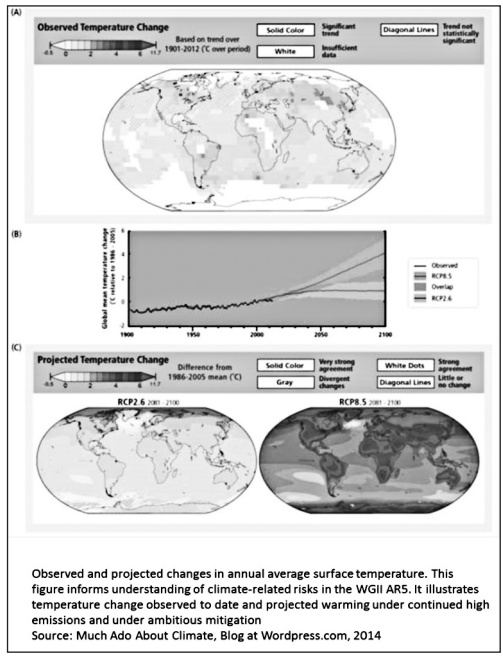
Mohammed Ghanim Al-Ali Al-Maadheed

Introduction

Work done by scientists has shown that the Earth's climate has changed since ancient times. The coming and going of ice ages have been traced as a part of these studies and have been attributed mainly to changes in the amount of sunlight (solar energy) received as a result of small variations in the Earth's orbit. However, the 20th and 21st centuries have seen an alarming warming trend like never before; this time mainly induced by humans. Furthermore, climate disasters now account for 70% of all disasters around the world, up from 50% from two decades ago. This trend requires a strategic shift toward managing and mitigating disaster risks rather than just managing a crisis after a disaster has occurred. This is the key in not only reducing the impact of such disasters but also in optimizing scarce resources for better humanitarian support.

Global warming at a rate of about 4 degrees centigrade or more per year, as being currently recorded as per the World Bank, could lead to catastrophic climate change. This is due to a high release of greenhouse gases (mainly Carbon Dioxide - CO2) resulting from unprecedented increase in the burning of fossil fuels (coal, petroleum) as a result of rapid industrialization and transportation activities. The consequence of this has been seen in increased incidences and intensity of natural disasters and health risks around the Earth like never before. Deforestation,

land-clearing and urbanization have not helped but rather worsened the situation. The frequency, complexity and cost of dealing with the humanitarian impact of these events pose a serious challenge.



Observed and projected changes in annual average surface temperature. This figure informs understanding of climate-related risks in the WGII AR5. It illustrates temperature change observed to date and projected warming under continued high emissions and under ambitious mitigation
Source: Much Ado About Climate, Blog at Wordpress.com, 2014

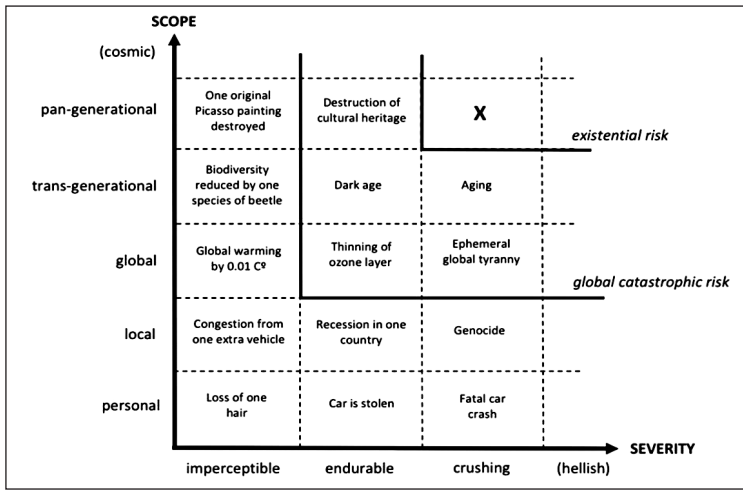
Increased and erratic precipitation and snow melt have led to a rapid increase in sea levels as well as floods in some areas and droughts in other areas. Other natural disasters like cyclones, landslides and earthquakes are all linked to these changes. Besides, increased instances of extreme heat, poor air quality, allergens in the air, and the spread of diseases that are linked to global warming are clearly observable.

The way these events impact the living conditions and survival of vulnerable communities is a cause for global concern. The

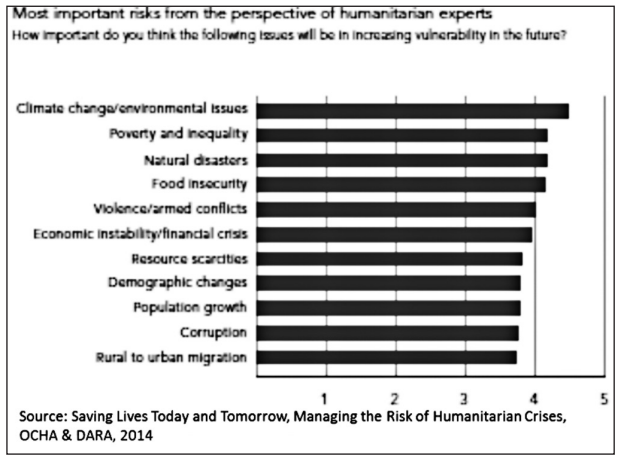
communities are impacted in terms of their food and water security, agriculture and forest resources, as well as health and tourism.

Sea levels rose about 17 cm in the last century. In the last decade it has risen at twice this rate. Correspondingly, global temperature reconstruction shows that the 10 warmest years in the past 2000 years have been in the last 12 years. Wars due to ccompetition for resources, civil unrest and related destructive events of socio-economic and political dimensions related to climate change have intensified as well in the past decades. These may have far-reaching consequences on the geo-political future of our planet.

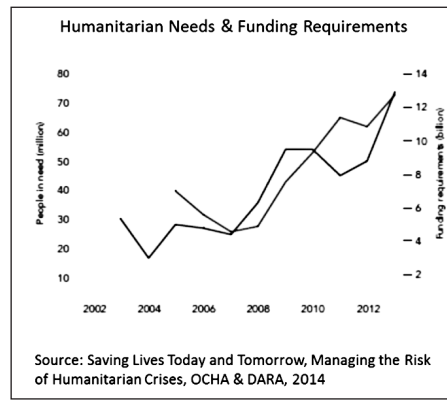
The Future of Humanity Institute, University of Oxford, has classified climate change caused by global warming and thinning of the ozone layer as a 'global catastrophic risk' -- a risk that has the potential of inflicting serious damage on the well-being of human beings on a global scale.



Similarly, another listing of 'Most Important Risks from the Perspective of Humanitarian Experts' in a study led by the UN Office for Coordination of Humanitarian Efforts (OCHA) has Climate Change/Environmental Issues as the number one risk (out of 11) in terms of increasing vulnerability in the future. This is higher than risks related to violence/armed conflicts, economic instability/financial crisis, population growth, corruption, etc.

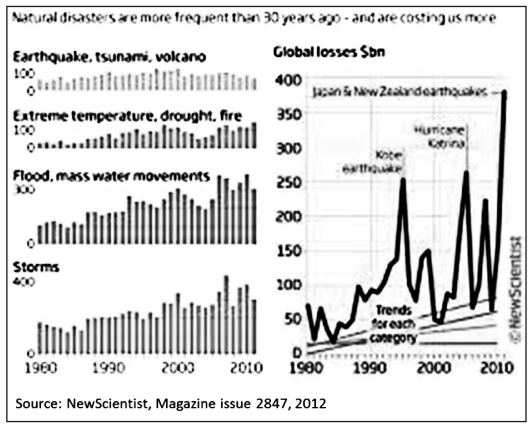


This report also highlights that the number of people targeted by international humanitarian assistance has almost doubled between 2002 and 2012. Inter-agency appeals typically aim to assist 50 to 70 million people each year, compared with 30 to 40 million 10 years ago. Funding requirements have increased more than three times to over US$10 billion per year.



Impact of Natural Disasters on Global Economy and the Vulnerable

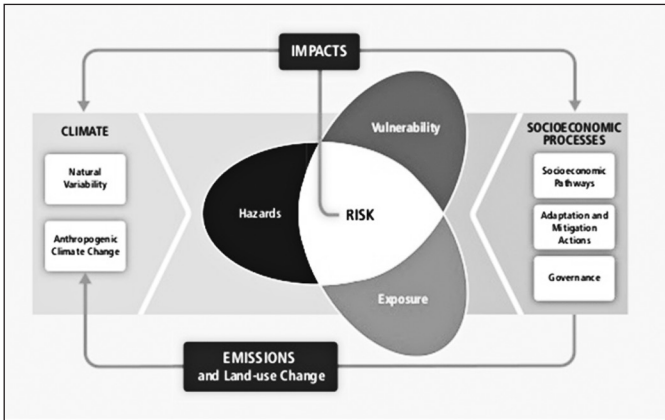
Furthermore, global economic losses from natural disasters including the Japan and New Zealand earthquakes in 2010 went up to nearly US$400 billion compared to global losses of US$50 billion in 2000. Interestingly, only 4% of the US$10 billion discussed above that is spent on annual humanitarian assistance is devoted to prevention. Yet every dollar ($1) spent on risk reduction saves $5 – $10 in economic losses from disasters. These estimates, however, do not take into account the further intangible benefits of averting disasters across moral, political and practical dimensions.



The numbers discussed above could only multiply in the future unless serious action and efforts to raise awareness levels are intensified. The need for a risk management driven approach that enables a strategic shift towards managing risks rather than just managing crises is hence imperative and is being increasingly recognized globally.

We must remember risk is often subjective, yet managing it is a key requirement; hence if led to a snake hole with fresh snake trails, would anyone put his hand into it in spite of any assurances of safety that one may provide.

'Weather and Climate Events' along with 'Vulnerability' and 'Exposure' are three crucially connected factors that affect 'Disaster Risk.' Hence, in this cause – effect continuum, climatic events and socio-economic development that support disaster risk management and climate change adaptation are linked. Therefore focus on reducing exposure and vulnerability increases resilience in the management of the impact of these events.

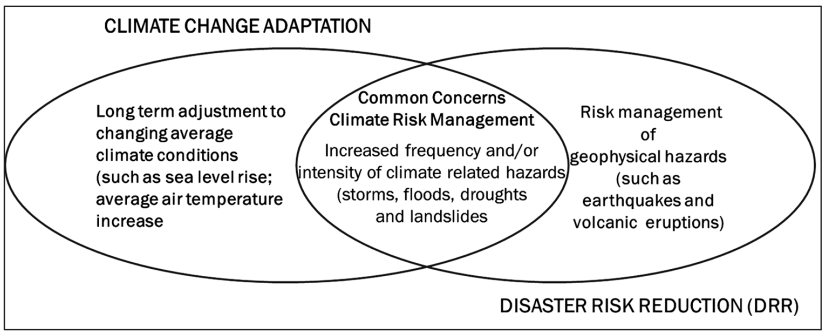


Source: INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE report – CLIMATE CHANGE 2014, Impacts, Adaptation, and Vulnerability, 2014

'Vulnerability' and 'Exposure' are connected, and can increase due to multiple factors related to increasing population, which places additional pressures on settlements in high-risk areas (e.g. flood plains) and rapid unplanned urbanization, environmental degradation, conflicts, epidemic diseases, poverty, etc. Hence,

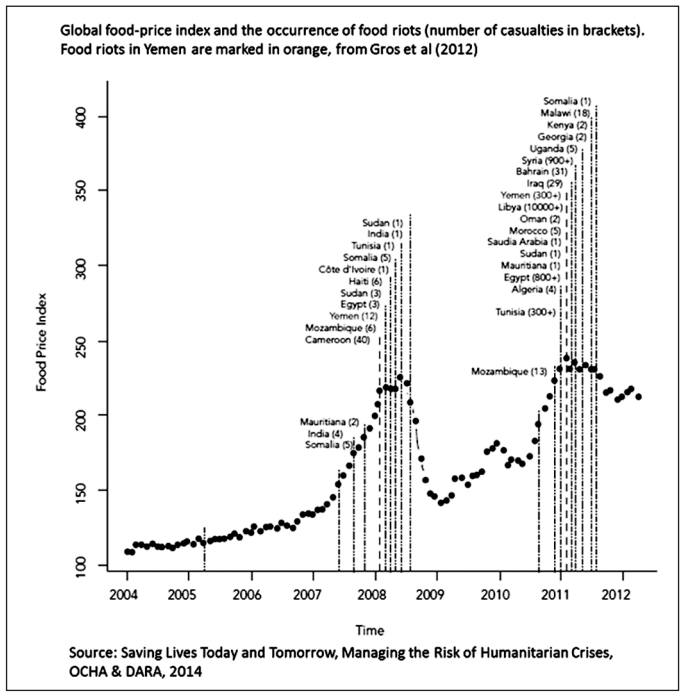
absence of adequate infrastructure related to housing, water and sanitation facilities, education, healthcare, governance and institutional support to mitigate disaster/crisis risk, etc. put poor world economies and certain groups of population at a higher risk compared to others.

Cities will grow, covering from 50% of world population to 75% due to migration from rural areas and migration across international borders, coupled with unplanned development in high risk areas. Jeddah in Saudi Arabia is an example of a city facing an increasing population and an increasing pressure on its infrastructure such as water resources and health services, thus increasing its 'Exposure' and 'Vulnerability.' Challenges related to waste management, air pollution, utilities, infrastructure and health risk are building up in such cases.



Cities in various parts of the world that have been historically built on sea shores (easy access and sea transportation) and around rivers (water availability) are also at high risk of natural disasters like cyclones and flooding. Human settlements in mountainous areas (for security or cooler climate) are exposed to higher risks from landslides, avalanches and cloud bursts.

To worsen matters, beyond the physical damage caused by such climate change related events, conflicts increase due to increased disagreements among people over perceived lack of equity in sharing resources which are becoming scarce – e.g. conflicts caused by lack of drinking water in drought-prone regions. The role of climate change and its negative effects on conflicts in Darfur and Kenya have been mapped. The collapse of governments and institutional mechanisms for food and water distribution worsens matters in such situations.



Source: Saving Lives Today and Tomorrow, Managing the Risk of Humanitarian Crises, OCHA & DARA, 2014

Displacement of population in areas affected by conflicts leads to crises related to mobilizing resources to help refugees, with

supplies often unable to meet needs. Even normal winter conditions in some parts of the world could lead to a disaster situation in refugee camps due to the chilling cold and absence of enough protection for the people in these camps.

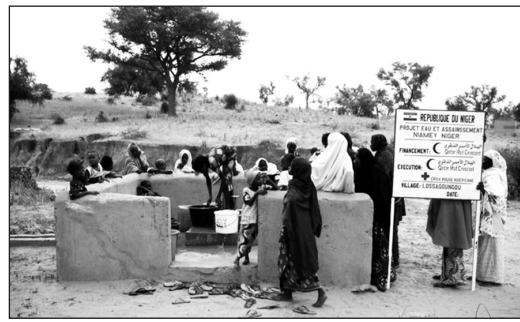
It is clear from the discussion above that informed risk assessments and strategic actions can significantly reduce 'Vulnerability' and 'Exposure,' which in turn reduces 'Disaster Risks' substantially. Hence, Climate Change Adaptation and Disaster Risk Reduction (DRR) while not overlapping fully need to converge further as both share the concern of managing the 'Climate Risk' and reducing 'Vulnerability' and 'Exposure' to achieve sustainable development.

Assessments of climate change risks have rarely led to consensus on the distribution of exposure, vulnerability or possible outcomes. However, the earlier paragraphs show that there is overwhelming evidence from the past decades and predictions for the future of increasing climate change events as well as associated increase in volume and costs for humanitarian assistance. Hence, despite the uncertainties, there is a strong need to put together and enhance proactive mitigation and development strategies to reduce the focus on reactive disaster response plans. This will lead to the right planning, judgments and decisions to assign scarce resources more proactively and effectively to manage a growing need.

Climate Change Adaptation and DRR both share the concern of managing climate risk, reducing the vulnerability, and achieving sustainable development.

The Role of the Red Cross and Red Crescent (RCRC) Societies

Red Cross and Red Crescent (RCRC) Societies are good examples of organizations that direct institutional action focused on humanitarian aid and support to areas affected by climate change and related disasters. For over 150 years, these organizations have been at the forefront of efforts to reduce the impact of natural and man-made disasters and alleviate the suffering caused by them. Their approach has however been changing from emergency disaster relief to a focus on Disaster Risk Reduction (DRR) and disaster preparedness as well as support of recovery for affected local communities.



The International Federation of Red Cross and Red Crescent Societies – IFRC (which integrates the RCRC Societies) Plan of Action - Climate Change 2013 - 2016 lists the following key priorities for IFRC work on climate change in the coming years:

- Climate-proofing of IFRC programmes and operations.
- Strengthening community preparedness and response capacities with a specific focus on community-based early warning and monitoring systems.
- Scaling up public education and awareness activities on disaster risk reduction and climate change to build capacities at both NSs (National/RCRC Societies) and community levels.

- Increasing engagement with national level planning, in particular with reference to the NAP process, and ensure that information collected through VCAs (Vulnerability and Capacity
- Assessments) are fed into national/local planning.
- Promoting the sustainable use of natural resources and rehabilitation of the environment to increase resilience of livelihoods to shocks and reduce risk.
- A long process of learning from experience, realization and strategic action has led to the clear establishment of the philosophy that relief is not enough and there is a need to prepare exposed and vulnerable communities to be more prepared for and resilient to disasters.

The above priorities are proposed to be achieved through three strategic objectives:

- **Objective 1:** Strengthening organisational capacity on climate change.
- **Objective 2:** Mainstreaming climate change adaptation and mitigation in policies, sectorial programmes, and interventions across the contexts.
- **Objective 3:** Promoting advocacy, public awareness and partnerships.

The United Nations World Conference on Disaster Reduction (WCDR) in Kobe, Japan, approved the Hyogo Framework for Action (HFA) for Disaster Risk Reduction (DRR). 168 governments and leading development and humanitarian organizations from across the world signed the HFA committing to a ten-year plan (2005 – 2015) to invest in DRR as a means to develop disaster

resilient societies. The five priorities identified by the HFA are as follows:

1. Ensure that disaster risk reduction (DRR) is a national and local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors.
5. Strengthen disaster preparedness for effective response at all levels.

Conclusion

With the onset of 2015 and the 10-year term of this initial HFA coming to a close, there is debate building up on how the HFA priorities need to be taken forward. Likewise, the need of the hour is to continuously enhance focus and efforts on generating awareness on, tracking, measuring and mitigating disaster risk with a view to managing climate change on the one hand, and optimizing humanitarian response to potential and resulting disasters on the other, through resilient communities.

The Pearl – Qatar District – A resilient community focused on sustainable development

Mobilizing People of Faith in the People's Climate Movement

Calling for Ethical Business and Government, Decisive Action on Climate and Decentralized Clean Energy

Ven. Santussika Bhikkhuni

Introduction

At this moment in human history, the unrestrained extraction and burning of fossil fuels has brought us, in the industrialized nations, to a point where we are contaminating and pillaging the earth to such an extreme that we are endangering life as we know it for humans and animals on this planet. People around the world are experiencing the devastating effects of climate change in the form of cataclysmic storms, droughts, floods, wildfires and sea-level rise, which take lives, destroy homes, threaten food security, and reduce access to fresh water. These problems are just the beginning. We are told that if we do not make changes very rapidly, we are heading for a world that is inhospitable to human life. Our very civilization is at risk and our governments are still not taking the necessary action to avoid disaster. Why? Because the billionaires behind the corporations who profit from the fossil fuel industry and other industries that rely on fossil fuels use the power that comes with these huge profits to corrupt world governments and tie the hands of those who wish to take on the enormous task of changing our course. What will it take to turn the tide? People from across the globe, from every walk of life, every religion and all economic classes, are joining together in a massive movement to put pressure on those in power to take decisive, effective action on climate.

The Moral Imperative

There is overwhelming scientific evidence that human behavior is causing climate change.[1] The serious impacts of climate change are already being observed all over the world.[2] Continuing to burn fossil fuels poses serious risks to human civilization and higher forms of life on earth.[3] Changes to our planet resulting from increased levels of CO_2 in the atmosphere are happening at a rate much faster than anticipated by any of the scientific predictions. We are the first generation to witness the effects of anthropogenic climate change and the last one to be able to do something about it.

As we realize that this is happening and that our decisions now will impact all future generations of every species on Earth, we cannot stand idly by. It is imperative that we do all we can to keep the average global temperature increase as low as possible and to prevent run-a-way climate change. Whether people are primarily concerned for their own welfare, the welfare of their children and grandchildren, or all future generations, or many the species of animal life on Earth, or they just feel deeply that it is important to try to save human civilization or preserve the beauty of this planet, everywhere people are beginning to look for ways to help.

People are realizing that their own involvement is needed because our leadership has lost its moral compass.

The people leading fossil fuel corporations — the owners, executives and directors — are doing all they can to extract and sell as much fossil fuel as possible, and shareholders are

happy to receive the profits. They seem oblivious to the fact that these activities are destroying the biosphere. It has become an industry of lying, stealing and killing, much like the tobacco industry when smoking was linked to cancer and other diseases. The moral choice for those corporate leaders would be to stop producing and selling their destructive products, and for shareholders to refuse the profits and to pressure the executives and directors to convert their companies to safe energy production. The fossil fuel company leadership should try as hard as possible, along with the rest of us, to keep 80% of the known reserves of fossil fuels in the ground[4] and to immediately stop all exploration for more fossil fuel. On moral grounds, they would also immediately stop all extreme methods of extraction: mountain top removal, fracking, tar sands and deep-sea and arctic drilling. All these methods are extremely destructive to the environment and move us more quickly towards the horrific future we will face if we do not change our course.

However, fossil fuel corporate executives continue to try to convince the public that we are not in danger. They try to obscure the facts by raising doubt about scientific findings, just as the tobacco industry did before them. They spend billions on campaign contributions, on lobbying and on disseminating misinformation to confuse the public and to impede appropriate action by governments to curb CO_2 emissions. They are using every means their money can buy to be able to continue with business as usual.

It is government that must say "no" to the fossil fuel industry. It is not enough for individuals to simply change their personal behaviors and choices. However, many of our government

leaders have also lost their moral compass. They are swayed by the pressure that billionaires are putting on them. Even though many of them know the truth, they believe they cannot get elected without cowing to the power elite.

Governments are supposed to protect the public from those who lie, steal and kill. Regardless of the form of government in any country, the people hope the government will protect them rather than exploit them. Abraham Lincoln, in the famous Gettysburg Address, described the US government as "government of the people, by the people and for the people." Now, however, many Americans believe that we have government of the billionaires, by the billionaires and for the billionaires.

The Responsibility Of Faith Leaders

Protection of life is part of every major faith tradition, as is generosity, hospitality and a sense of social justice. To contribute to the destruction of the environment to the point where it can no longer support human and animal life, especially for the sake of profit, couldn't be further from the tenants of any religion. Faith leaders are responsible for helping people follow their faith, teaching them and supporting them in doing what is morally right. Christian, Jewish and Muslim leaders recognize the importance of taking care of God's creation, of helping and protecting the poor, and of not endangering oneself and others through evil actions. The Hindu tradition understands that man is not separate from nature; knowing that the Divine is present everywhere and in all things, Hindus strive to do no harm. Buddhists come from a somewhat different perspective and use somewhat different language, but have the same intentions.

They refer to the workings of karma and the development of loving kindness, compassion and wisdom. Indigenous leaders encourage us to connect to Spirit and to remember that we are not separate from nature but are fully part of it. The results are the same: a call to wholesome action, a call to strengthen ourselves with faith and goodness, a call to care for one another and the Earth itself.

People of faith see the importance of protecting those who cannot adequately protect themselves, to help the "front-line communities," the poor who often bear the brunt of climate change. Ironically, so far those who are suffering the most are those who have contributed the least to climate change. Recognizing this fact moves people to try to do more to help.

Many people who don't identify with any faith still operate with these same principles of love, kindness and compassion. Anyone with children or grandchildren who recognizes the threat of climate change wants to help protect them. These are natural responses.

When faith leaders speak out about the reality of the way things are, people are encouraged to face the truth. When faith leaders take a stand and take action themselves, people are empowered to take action as well. Faith leaders help those taking action to do so peacefully and with purity of heart and intention while maintaining inner strength and balance.

Every social justice movement gains real power once the faith leaders get involved and show the way. Therefore, it is crucial now that leaders from all faith traditions get involved and carry the banner of peace, justice and respect for life.

Organizing People Of Faith In The People's Climate Movement

The People's Climate Movement has become the focal point for many other movements because the same forces responsible for the climate problem are also causing other forms of suffering and dissatisfaction. The People's Climate March on 21 September 2014 in New York City drew together more than 1,500 US organizations as partners. These included labor unions, political organizations, faith organizations, corporations, and educational, professional, social, policy, special interest, activist and environmentalist organizations, as well as many more.

I have been involved in the climate movement since 2010, teaching about climate change and Dharma: trying to help people understand how we can maintain our own inner balance and develop the heart, while facing the grim reality of climate change and taking effective action to address it. I participated in local 350.org meetings and local and national actions such as the *ForwardOnClimate* Rally held on 17 February 2013, in Washington, D.C., where 45,000 people showed up. It felt like we needed 400,000 instead. I learned through experience that I, as a Buddhist nun, could be most useful by reaching out to fellow Buddhists and also by being a calming presence at such events. By the time organizing efforts began for the People's Climate March, I had already experienced a number of peaceful, meaningful and uplifting marches and rallies. So, I was ready to help inspire people to get involved.

Rev. Fletcher Harper, Executive Director of Green Faith, began leading weekly conference calls with faith leaders from all over the United States to discuss how we could reach out to people

of faith and encourage them to come to the People's Climate March. Many different faith groups were represented on the calls and each of them formed working groups. The Buddhist working group started out with three of us, after which we began to find other Buddhists working on climate in other parts of the country. Soon we had a vigorous group reaching out to Buddhist temples and meditation groups across the nation. In particular, the Buddhists in New York City came together to host people coming from all over the United States to participate in the march.

These weekly calls were motivating. As each faith representative reported on what their working group was doing, we were inspired to do more. Early in our work, when I heard that members from 40 mosques were coming to the march, I was encouraged to build up Buddhist involvement. I was touched by the sensitivity each faith group showed to the others. It was one of the rabbis who pointed out that we shouldn't hold a breakfast meeting during Ramadan out of respect for our Muslim brothers and sisters. The spirit was one of inclusion, camaraderie, respect and hope.

We learned a lot from one another and from the expertise of seasoned organizers, like Rev. Fletcher Harper and Pat Almonrode of 350.org, who kept us informed about what was happening at the top level of organizing for the march. The people of faith were given a particular street to assemble on for the march. It was one very long city block near where the march would start. The New York City Police estimated that 10,000 people could fit on that block. Rev. Fletcher Harper told us that it was our job to fill that space.

As the weeks progressed, more and more was being written and discussed about the upcoming march. People came forward to add their own creative talents for ways of getting the word out and developing artwork to use during the march. A Noah's Ark float and an inflatable mosque appeared, along with lots of signs and banners. Amidst the festive feeling, we never lost site of the crucial importance of the message "Take action now! There is no time to lose."

I was part of an effort to organize "The People's Climate Train" to carry 170 people across the country from San Francisco to New York City. On the train, we held 50 different workshops on climate change, including a Faith Leadership Panel that included voices from more than ten different faith groups. Each one provided impassioned encouragement and insights. The words of the indigenous elders were particularly striking. They spoke to us with profound depth and great heart about our true place in the natural world, the imperative to connect to Spirit, and the need to recognize that those who are destroying the life-support systems of this planet for future generations are suffering from a mental illness. How else could they continue to destroy the future of their own children?

By the time we were assembling for the march, there were many more than 10,000 people of faith, with about 900 Buddhists and nearly 400,000 people in all.

Building The Movement - A Unified Voice

The march was completely peaceful and clearly focused. People from all walks of life came together to put pressure on our world leaders, who were gathering that week for the United Nations climate summit, to impose stiff regulations on fossil fuel emissions, to change the systems that perpetuate social, economic and environmental injustice, and to protect everyone, especially the poor and vulnerable among us.

People were also clear that this march was only one step in the movement needed to ensure that these necessary changes will happen. The People's Climate March, along with the 2,646 solidarity events around the world, made a powerful statement. It demonstrated the growing concern of people everywhere and their willingness to take a stand. The work that went into the march went a long way to build up the people's climate movement. Now the mobilization efforts continue to bring in more and more people and make bigger and bigger statements. The people who realize the danger we are in will not stop until the necessary changes are made and their numbers are growing every day, with each person picking up their own piece of the work that needs to be done.

For myself, seeing the way people formed relationships that led to working groups for the People's Climate March and realizing that I could be most effective through reaching out to fellow Buddhists inspired me to create the Buddhist Climate Action Network (BCAN)[5]. BCAN's purpose is to connect and organize Buddhists (and friends) across all traditions to take effective action on climate, while incorporating Buddhist practices and principles. BCAN groups are springing up around the United

States, where people can meet to get to know each other, practice the Dharma together and plan their engagement in climate activities. There are so many actions happening now around the world, organized by a wide variety of groups ranging from environmentalists to trade unions to concerned parents to lobbyists and so on, that BCAN groups may rarely if ever need to create their own actions. Instead, we put our focus on gathering together and joining forces to increase the effectiveness of efforts in progress spearheaded by other well-organized, reputable and entirely non-violent organizations.

BCAN works in close connection with One Earth Sangha[6] whose mission is to "support awakening and responding to climate change and other threats to our shared home through education, sustainable living and advocacy … to explore the teachings of the Buddhist path and how they can inform, support and motivate this work." BCAN connects with international interfaith efforts through Green Faith[7] and their Our Voices[8] campaign and the main organizing secular groups in the People's Climate Movement such as 350.org and Avaaz.

There are many levels of activity to engage more people and build the movement. There is the level of conferences, media articles and broadcasts, blogs and websites, Facebook posts and Twitter feeds, events that educate and motivate, music, art, inventions, organizations and direct action. Noami Klein's excellent book *This Changes Everything*[9] lays out a clear path through the transformation of energy, economic and political systems, reigning in corporate power, rebuilding local economies, and reclaiming our democracies. And how will this be accomplished? Through action. She writes:

> As Scott Parkin, a climate organizer with the Rainforest Action Network, puts it: *"People are hungry for climate action that does more than asks you to send emails to your climate-denying congressperson or update your Facebook status with some clever message about fossil fuels. Now, a new antiestablishment movement has broken with Washington's embedded elites and has energized a new generation to stand in front of the bulldozers and coal trucks."* And it has taken the extractive industries, so accustomed to calling the shots, entirely by surprise: suddenly, no major new project, no matter how seemingly routine, is a done deal.[10]

The message to change the systems is amazingly consistent coming from every corner of the globe. And yet,

one of the great challenges facing BCAN and other climate action groups is the need for greater diversity. Beyond involving ethnic Buddhists coming from various Asian cultures, it is essential that BCAN become truly integrated along socio-economic and racial lines. As J. Mijin Cha states in *Diversity Is the Lifeline for the Future of the Climate Movement*: "The way forward is to look within organizations and within ourselves to acknowledge and address internal racism and oppression. Organizations must look deep inside themselves to see if their priorities are shared by communities of color, rather than creating a set of priorities and asking communities of color to sign on."[11]

Every one of us willing to participate has a role. Often we find ourselves capable of taking on a more powerful role than we ever imagined due to the support of acting together. But even if you never find yourself blocking a bulldozer, there are many ways to take action and much work to be done to help more and more people understand what is happening and to get involved. We all have the opportunity to speak from the heart to those within our spheres of contact and influence, to friends, family members, co-workers, fellow social and religious group members, and so on. Of course not everyone will listen, understand and take action. The good news is that we don't need everyone. We just need enough people to turn the tide.

Concrete Steps

An important focus in 2015 is the "Road to Paris." We need to do all we can to ensure that all nations around the world are ready to make binding commitments for fossil fuel emission reductions that will begin to slow the progress of climate change and eventually reverse it. We must apply as much pressure as we can on government leadership in 2015 and beyond, especially in the industrialized nations. We must support government leaders who will take action on climate and pull support away from those who won't. This includes voting and financial support. We need to put people in power who pledge to take action on climate and hold them to their promises. We also need to let those in power know that if they don't take decisive action on climate, they will be out. During this critical time, we must never pass up a chance to vote and exert our influence on government for the greater good.

In every way available to us, we must apply pressure to stop the most destructive practices of the fossil fuel industry, such as fracking, tar sands, mountain top removal, deep-sea drilling, transport of dirty oil through pipelines and on tanker trains, etc. We must apply pressure to clean up governments, get special interest money out of politics, disclose who is really behind political ads, and reverse the decision that gives corporations the same rights and powers as persons. In short, we need to strike at the roots of the systems that contribute to climate change and perpetuate social and economic injustice.

This requires speaking the truth and spreading the word, joining letter-writing campaigns, visiting governmental offices, voting, boycotting products, divesting from fossil fuels, participating in demonstrations, and blocking extraction and transport activities. In short, it is imperative that we take action by body, speech and mind NOW!

Conclusion

Again and again, we have all heard that we know what is causing climate change and how serious our situation is, that we already have all the necessary technology to shift from fossil fuel energy to clean, renewable energy, and that we lack the political will to make that change. It seems insane that given what we know, what is happening and the risks we are facing that people in power need political will to take decisive action. Isn't it enough that all humanity is threatened? Whatever happened to true leadership?

Since it seems that many world leaders are not up to the requirements of the moment, it is up to us, the people, to take the reins and make the necessary moves. For some, this means working within the systems that are in place. Others believe that whole systems must be dismantled and replaced. These revolutionary thinkers believe that we need to do away with capitalism and replace it with a system that doesn't depend on continual, unsustainable growth. Many believe that we need to completely rethink and renovate our global economic, energy and political systems. New visions are developing for systems that are distributed rather than centralized, empowering and benefitting many rather than a few.

Regardless, there is no doubt that we are in for big changes world-wide. How will we make these changes? Will we hold moral action above all the pressures that we are likely to experience? Will we act peacefully and responsibly, in unison, for the benefit of all? Will we make changes that are sufficiently dramatic to reverse climate change and yet careful enough to ensure a peaceful transition? What will the new world be like?

Climate change is already well on its way. We are going to experience difficulties. It is up to us to choose whether the future for humankind will be difficult, very difficult or impossible. Where do you stand? What are you willing to do?

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Buddhist Reflections on Human Intervention in Nature

Pinit Ratanakul

Introduction

The eco-crisis we have been experiencing is the effect of global environmental deterioration its harmful impacts on our lives and living organisms have created a sense of urgency in our societies. Climate change, particularly global warming has been the focal point of our ecological concern. Climate change occurred periodically in the earth's history. What makes the present situation unique is that for the first time it is induced by human societies and its consequences for human existence and the earth are formidable. The present climate change is therefore the effect of human intervention in nature that has jeopardized its eco-systems and caused global warming. As it is made-made climate change in particular or eco-crisis in general involves technology and values underlying man's understanding of nature and his relationship to it. Climate change is thus technological, ethical and spiritual or religious. All these aspects of climate change pose great challenges to science, ethics and religion to use their expertises to dissolve the crisis.

Science has already contributed to the solutions with technological change in energy conservation and the reduction of greenhouse gases, particularly carbon dioxide (Co_2) and in the use of alternative energy from nuclear power and renewable sources such as sun, wind and water. Energy science is presently

pursuing researches on the use of hydrogen which is abundant in nature as the new source of safe energy to replace the fossil-fuel energy that has been polluting the earth. It is now overdue for ethics and religion to deal with the value-laden aspect of the eco-crisis and offer solutions to it.

Due to our awareness of the human cause of the environmental crisis and our accepting altitude to climate change many of us are now pondering on human nature and our relationship to the natural world which are the root-causes of the crisis. Despite our minor status in a vast number of beings in the universe we human beings have intelligence, an ability to think and a capacity both to transcend over nature to fulfill human potential and to transform nature, and even to do permanent damage to it. It is a paradox that human beings who have intelligence and ability to think are the biggest-destroyers of the environment and biodiversity of which all living beings including human beings depend while animals that cannot think instinctively preserve them. There must be something wrong in human nature and our attitude to nature that has brought man to this paradoxical position. This article is my reflections on the Buddhist views of human nature and reality and its implications for human intervention in nature.

Buddhism And The Natural World

Buddhism is known as a religion of compassion. Beginning with the Buddha's mandate to his disciples that they were to go forth for the happiness, the weal and welfare of all sentient and non-sentient beings, Buddhism has sought to instill a respect and caring concern for not only human, but for plant

and animal life as well. The decrees of the 3rd century B.C.E. Buddhist King Asoka established law for the human treatment of animal-law restricting meat consumption, curtailing hunting and the building of hospitals and watering stations for animals. Engraved on one of the rock pillars still found in India are Asoka's words, "*on bipeds and quadrupeds, on birds and aquatic animals, various benefits have been bestowed by me-even as far as the gift of life.*"[1] That mandate finds voice in different words of many leaders of Western Buddhism. The Dalai Lama, who is the leader of Tibetan Buddhism, for example, writes in his book, *Inner Peace and World Peace*, that as all beings desire peace, comfort and security, they should possess these things by right. Similarly, Thich Nhat Hanh, the Vietnamese Zen teacher who commands a large followers in the West, interprets the first precept against killing in terms of environmental protections.

Aware of the suffering caused by the destruction of life, I vow to cultivate compassion and learn ways to protect the lives of people, animals and plant-our entire planet.[2]

His interpretation of the second precept against stealing is in the same all-inclusive manner :

Aware of the suffering caused by exploitation, social injustice, stealing and oppression, I vow to cultivate loving kindness and learn the ways of working for the well-being of people, animals and plants…..I am determined not to steal and not to possess anything that should belong to others…..I will prevent others from profiting from human suffering or the suffering of other species on earth.[3]

This compassionate attitude towards the natural world is also emphasized by Robert Aiken, the founder of the Diamond Sangha in Hawaii, who interprets "right livelihood", the directive of the Eightfold Nobel Path, the way to spiritual fulfillment *(nirvana)*, to include prohibition against engaging in any activity that "*kills the soil, cows, chickens, trees as well as children; any occupation that exploits any human being, animal or plant for selfish benefit.*[4]

These interpretations of compassion in the context of ecology by Western Buddhist leaders are in accord with Buddhist ideal of compassion *(karunā)*. It radiates towards all beings, living and non-living, born and unborn. It implies a gentle and caring attitude towards nature and a moderate consumption of its resources taking into consideration the long–term effects on eco–systems and nature as a whole. This compassionate approach to nature constitutes a Buddhist response to the environmental crisis.

Buddhist View Of Reality And Human Nature

Apart from the teaching of compassion throughout Buddhist scriptures there is emphasis on voluntary simplicity and on non-attachment or non-clinging to material possessions. While not extolling poverty, Buddhism does teach the middle way between self-indulgence and self-mortification. These admonitions would go far today to temper rampant consumerism and the unnecessary exploitation of nature. Emphasis is also on purity of heart as the moral ideal Buddhism makes greed *(loba)*, along with hatred *(dosa)* and ignorance *(avijja)*, the three attitudes that pollute the mind and prevent spiritual fulfillment

(nirvana). Today greed which breeds selfishness and suffering is expanding. It is one of the main attitudes responsible for the pollution of the earth, the unnecessary exploitation of natural resources and the permanent damage to eco-systems.

Behind and support of all these teachings is the Buddhist understanding of reality which sees all beings, plants, animals, human beings and the world as a whole, as manifesting the universal qualities of impermanence and change *(anicca)*, suffering/unsatisfactoriness *(dukkha)* and no-self/nonsubstantiality *(anatta)*. It is a world in which all beings come to be, act, relate, are sustained, pass away and are reborn according to the principle of *paticca samuppappada*, translated as the principle of "co-dependent origination" or, as preferred by Thich Nhat Hanh and his followers, the principle of "inter-being".[5] The doctrine of co-dependent origination developed out of the concept of *karma*, the law of cause and effect which operates throughout the human and non-human world.

As all phenomena—things, happenings, human beings, animals and plant life—exist in and through this multiple casual network, nothing exists in isolation from anything else. The two corollaries of this belief is the doctrine of *anattā* that there is no such thing as an independent, self-sustaining entity-even a substantial self for everything exists only as the locus of a network of interrelationships and a multiplicity of changing and mutual causes and conditions. The other corollary is non-duality—that of mind and body and that of man and the natural world. This non-dualistic attitude towards nature is opposite to dualistic thinking that polarizes man vs. nature and places man over nature. While dualism regards the eco-crisis in relation to

technology the non-dualism regards it not only a technological issue but also an ethical and spiritual or religious matter. Accordingly, to degrade nature is to degrade ourselves and to protect nature is to protect ourselves. In this sense the pollution of the environment and the pollution of the mind need to be addressed as one aspect of the same problem.

The Buddhist interpretation of nature in terms of interdependence does not imply that there are no differences and diversity in nature and among species. In Buddhist view each individual being though being constantly transformed is unique, it helps to sustain the world and shapes its course of events in constant interactions. Man's place in the causal relationships is to not only to exist but also in conjunction with all else helps to create the world in which he lives. Even man is in nature he can change it and his ability to harm others goes far beyond what other animals are capable of. As human actions have permanent effects on the systems of sentient and non-sentient beings, man is morally obligated to be considerate towards nature and its inhabitants. This caring concern for humans, plant and animal life is the hallmark of man and the basis of human dignity.

Clearly the teaching of co-dependent origination is ecological. This principle has captured the attention of environmentalists who interpret it according to their ideology such as the Gaia hypothesis and the deep ecology principle. The Gaia hypothesis was formulated by James Lovelock, a British scientist, who recognized the earth as a self-sustaining organic presence such that we human live not on this planet, but within the earth which is has its own meanings and purposes, its own syntheses and creative transformations.[6] This holistic interpretations is

I believe more at home in Mahayana Buddhism, especially those branches in China and Japan, heavily influenced by Chinese Taoism, emphasize the presence of the Tao or Buddha nature in all thing.

In writing about an old debate in China and Japan over whether plants and trees were included in the eventual enlightenment of all sentient beings, William La Fleur quotes an 8th Century Chinese Buddhist who even dissolves the distinction sentient and non-sentient beings, asking "who can really maintain that things inanimate lack Buddhahood." La Fleur believes that given Mahayana holism and the logic of interdependence this conclusion was inevitable in this kind of interpretation the emphasis is on the continuum of all beings, their commonality, not their differences and diversity.[7]

In case of deep ecology this coined phrase is invented by Arne Næss, the Norwegian philosophers, referring to the deep relationship between man and nature. In this relationship man is embedded in nature as, a member of the large biotic community and has no privileges over other beings. Accordingly, there is a bio-centric equality—all things in the biosphere have an equal right to live and blossom and reach their own individual forms of unfolding.[8]

For me, the Buddhist doctrine of co-dependent origination is not biosphere centered as claimed by proponents of deep ecology although it supports ecological interdependence of all beings. What the interpretations of the Buddhist principle of interdependence in terms of the Gaia hypothesis and deep ecology theory seem to ignore are the differences between man

and other beings in nature discussed above and the actuality of conflict—not only within the non-human world, but between human interests and needs and that of other species. If all beings have an equal right to live and blossom how can we decide which whose life takes precedence when there is conflict between human life and that of other being? Was it wrong for medical science to wipe out the last remnant of small pox worldwide? Should we be fighting cancers, which is a natural process though lethal to the human body? Should a microbe which may be more important for the economy of nature therefore command more respect than a dog? When a child confronts a hungry tiger, do we save the child or step aside and allow the tiger to blossom? Should needy people be allowed to starve rather than to be allowed to introduce a new species for food even though it disturber the habitat of other species? The integrity of ecosystems as a whole may be one source of value and obligation, but can it be the only one? Is it possible to grant the same rights to every individual member of every species when in fact within the natural world itself conflicts of interests are inevitable and life prey, upon life?

Human Intervention In Nature

What these interpreters seem to ignore is the fact also that all agriculture itself – no matter how primitive of organic – is a human intervention in nature. Agriculture over the millennia has caused some species to become extinct, modified others and the environment and disturbed the eco-balance by the introduction of new species to a bio-system. The present need and practice of reforestation has done the same – changing the habitats of animals and plant life that lived in the old forests,

bringing in new species of trees. The domestication of animals for food, labor and protection has certainly intervened in their formerly wild state and habitats, and modified whole species. All these activities were begun by our ancient ancestors – primal peoples who have been romanticized as living in close harmony with nature. If we had remained hunters and gatherers only, there would have been no cultural advances. Also not to be forgotten is that the vast deforestation of the plains of India, China, North Africa and Europe occurred many centuries ago – as did the human caused extinction of many large mammal species well before the modern era. The real difference between primal peoples and ourselves is that today there are no frontiers left. There is now scarcely a region left untouched by human presence, unmodified by human activity. And that now we are approaching the limits of human migration and expansion and the use of natural resources.

It remains the case today that the preservation of the wilderness – those small areas left – and of endangered species by measures such as pollution control and limits on the use of resources will involve inescapable trade-offs with human employment, economic growth and regional development – that there are and will be conflicts between human interests and needs and those of the non-human world. The question then becomes, not shall we intervene, not shall we use nature to fulfill human need, but what shall be our principles of discrimination in further intervention in the biosphere and further use of natural resources. When it comes to a conflict of interests whose interests will be served? If life is the only basis for assigning value how are priorities to be established when it is life against life? If species preservation is the basis – how decide if and

when the human species or another species' survival interests are to be served? Are we justified in trying to eradicate the species of mosquitoes that causes malaria to save human lives? If the protein needed to save children from malnutrition can be obtained only at the price of animal suffering, is it justified? Is it possible for us to say that, all beings are equal, but some are more equal than others? That the great differences between beings both in their inherent good and instrumental good – from rocks to microbes to plants, animals and human beings – are morally relevant and can thus justify different treatment? Certainly to say that human value should be prior is not to say that all else is valueless. Buddhism which on so many issues advocates the middle way between extremes, it seems to me, can find a middle path here – between the individualism of animal rights positions and the holism of between a rampant anthropocentrism which sees nature only in terms of human use and a romantic biocentrism which doesn't seem to see human need at all.

Certainly Buddhism in its earliest texts lays down the mandate that human material prosperity and security should be provided for as the necessary condition of further human spiritual flourishing. And Theravada Buddhism is human centered enough to believe that plants and animals – even the gods – must be reborn as human beings to achieve *nirvana* – the highest spiritual fulfillment.

Whatever principles of discrimination for intervention in and the use of the non-human world are arrived at, they must include the recognition that it is the affluent peoples of the world that should be called upon for more sacrifices to save the

biosphere and species within it than needy peoples. And in the attempt to save species and not disturb unduly the biosphere, we dare not sacrifice important human values – those of health and food, meaningful work, social justice, economic development, participatory freedom and spiritual fulfillment. One possible principle of discrimination upon which middle path Buddhists might agree is that in the case of irreconcilable conflict between the human and the non-human and where crucial human values are concerned, then human welfare has priority, but that in all other matters, the well-being of the rest of the biotic community should outweigh any lesser human desires. Any interventions and use of nature should be done with the least amount of suffering, damage and destruction to the non-human world.

Conclusion

Buddhism has teachings and practices that can be interpreted in terms of ecology and used as healing measures for the ailing earth. Through the concept of interdependence we humans are not alienated from our true nature nor from nature and know our place and roles in the web of interrelationships. Our superior position in this web morally implies our responsibility for the well–being of the earth and all other beings. Similarly, the teaching of compassion reminds us of our humanity that should be displayed as gentleness and care in our relationship with nature.

The concepts of interdependence and compassion are the main ethical principles of Buddhist environmental ethics. The Middle Way is another concept that, together with these two

concept, forms the heart of Buddhist ethics. The Middle Way which means not too much, not to little avoids the extremes of excessive anthropocentrism and naïve biocentrism. While accepting the reality of human intervention in nature, Buddhist ethics sets limits to such intervention by the principles of interdependence and compassion. The eco-crisis is essentially the effect of the wrong view of ourselves and nature and the wrong relationship with the natural world. All these have to be corrected by right view of reality fostering a sense of connectedness with nature and by mindfulness curbing our ego–desire or greed, being considerate of others and living simply and consuming less. The eco-crisis also reminds us of our limits and the limits of the earth—resources and the carrying capacity of the environment–that there can be no more unlimited growth of the human population, or resource consumption, or of pollution. As the eco-crisis was caused by man only man can dissolve it by technological change and paradigm shift in development and life – styles. Buddhism offers a new way of thinking, doing and living leading to sustainable happiness and the emergence of ecological society.

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Devotion and Danger: Reflections on Hindu Ecology

R. Jeremy Saul

Introduction

In Hindu practice, any object or living thing is potentially a site where divine power may accumulate, thus becoming an object of devotion. Moreover, as articulated in Hindu thought for centuries, there is no fundamental division between God and creation; the soul of each person is actually one with Brahman, the divinized universe, which we ascertain through ascetic practice. We could extrapolate from these common principles to theorize Hindu ecology as an ethic of recognizing and protecting the divinity in and around us. But in this essay I would like to especially consider how this formulation intersects with the notion that the Hindu cosmos is simultaneously a dangerous place, in which nature is the abode of unruly spirits and more broadly chaos that overtakes us if we are not vigilant. I will therefore posit the ramifications of a Hindu natural world that is both a site where God is encountered and a risky passage on the way to that meeting. In this exploration, I argue that an analytical category like "Hindu ecology" involves bridging divergent significations — devotion and danger.

This essay will be divided into two sections. In the first section, I will discuss some core concepts in classical Hindu philosophy and current devotional practices pertaining to the environment, with particular attention to the transcendence of nature in asceticism and the gendering of nature as female. In the second

section, I will take up the concept of danger, initially looking at an Indic cultural perception of the environment in the village setting, where fierce local goddesses and ancestral spirits demand respect in return for their good will. Then I theorize devotion and danger as conjoined aspects of Hindu pilgrimage, where one's devotion to God is tested in passing through the dangers of nature. To illustrate this point, I will recall my experience on one of the most dangerous mountain pilgrimages in India. In closing, I will add some thoughts about what ecology means in the context of Hindu practice.

Hindu Conceptions of Nature

Within the diverse scope of Hindu traditions, Sankhya philosophy is pivotal in articulating the perception that physical nature is central to our understanding of how the cosmos works. Discernible in scripture by the 5th century BCE, Sankhya personifies all matter in the universe as one supernatural entity known as Prakriti or Nature.[1] This being is paired with Purusha, or Pure Spirit, the non-physical aspect of the cosmos. The primordial union of Prakriti and Purusha set the evolution of the universe into motion, thereby producing our world, constituted from both matter and spirit. As Sankhya commentators elaborated, the physical evolution of the natural world is a macrocosmic analogy for the development of consciousness within the individual mind.[2] Like the cosmos as a whole, our mind in its present, unenlightened state contains the residue of the pervasive primal spirit but we can no longer apprehend that spirit because Prakriti, the physical world around us, has lulled us into thinking that the world we see is all there is.

Prakriti is commonly characterized in Hindu tradition as female, while Purusha is its male counterpart. As a philosophical binary, this primal relationship is an early manifestation of the ongoing Indic theorization of the world, the basis of fertility, as feminine. Of course, from a theistic standpoint, God is in the world, but since Prakriti dazzles us with its diverse forms we must ultimately transcend through world-denying asceticism if we hope to reconnect with our spiritual self. In this duality of spirit and matter I suggest that we also see a rendition of the duality of devotion and danger that I have posited, in the sense that devotion carries us safely past risks to a kind of divine union.

Inasmuch as Sankhya itself is typically combined with Yoga philosophy in the Hindu intellectual tradition, its theory of nature-spirit evolution informs the yogic project of personal emancipation. For although the physical universe and mind have evolved away from primordial spirit, yoga, with its austerities and chaste lifestyle, can gradually reverse that evolution back to our primal state of consciousness. In reversing the natural evolution that enchains the human psyche within the physical world of endless rebirths, yoga permits the individual to effectively transcend physical limitations through renunciation of the world. This ultimate spiritual state, where physicality no longer distracts our thoughts, constitutes *moksha*, or release from the earthly cycle of endless rebirths. In this ancient theory of the world, nature is seemingly not so much to be cherished in its own right as tolerated as the staging ground from which we aim for liberation.

Sankhya-Yoga philosophy's suspicion of the physical world as an impediment to spiritual emancipation registers a male ascetic's

perspective that family life, entailing female companionship, domesticity and materiality, needs to be rejected in the pursuit of pure spirit. As I will elaborate in the following section, this feminized world of Prakriti aligns with a cultural mindset in India that the physical world is the abode of unpredictable local supernatural beings, especially goddesses, which must be placated for one to avoid personal misfortune. Traditionally, the imperative to keep unruly natural powers in check is accomplished through scriptural recitation and devotion, as seen in pilgrimages to shrines and rites of divine veneration.

On another plane of thought, Hindu cosmology tells us that the moral framework of our world, including the environment, inevitably shifts according to the particular era, or yuga, in which we live. The universe is essentially alive, and manifests in our daily lives. Hindu cosmic history entails repeating cycles of four eras, each lasting a million years or more. As the universe advances through each of the four eras, life becomes progressively less virtuous, as discerned in such ways as a decline in human lifespan, less respect shown for natural law or dharma, and an overall decline in social harmony and ritual purity. At the end of the cycle of four eras, the world then begins the cycle anew by returning to the first, purest era. As it happens, we now live in the Kali Yuga, which is the fourth and most degraded stage in the cycle. It should be no surprise, then, that humanity is now rendering the environment impure; cosmic history has predestined that outcome.[3]

The *yuga* doctrine is commonly known to Hindus of any background, and many will readily concur that our cosmic era is the ultimate reason for the world's problems. The term "*kali yuga*"

is usually translated as "the age of strife" in recognition of this degradation, but some Indians go so far as saying that this term means "the age of industry," as "*kali*" in Sanskrit can also be taken to mean a kind of instrument or "machine."[4] This second meaning of the term thus implies that modern industrialization and material advancement, seen as correspondingly a degradation of the spiritual state of the world, is a consequence of cosmic destiny. Seen in this light, ecological awareness is one dimension of Hindu theology. Must we therefore accept this trajectory of environmental degradation with resignation because it has been cosmically predetermined?

I observed in fieldwork on Hindu shrines in northwestern India that worshipers commonly explain that our best hope to personally counteract the negative influence of the era is to embrace God in any manifestation and to lead a dharmically pure life. Hence, while the ancient ascetic was expected to look beyond Prakriti to rediscover primordial Purusha, the current-day devotee is advised to look to the divine to reinstitute a primordial righteousness otherwise presently lost to the world. Indeed, inasmuch as my respondents, who were by and large devotees of the monkey god Hanuman, they reminded me that the monkey god has preserved for humanity the superior virtue of earlier cosmic eras. As they explained, after Hanuman had rescued divine Sita from the clutches of the demon Ravana in a previous era, she and her consort Rama gratefully granted the monkey god the boon that he, alone among the gods, would remain immortal and close to earth as a savior for humanity in all succeeding eras. But while individuals will find benefit in *bhakti* or devotion to God, we may ask whether such devotion can alter the cosmic fate of the world at large, as exemplified in environmental degradation.

Notwithstanding individual perceptions of divine salvation in a degenerate era, large-scale ecological movements to save Prakriti in modern India are essentially secular affairs rooted in socio-economic discourse. Even so, such movements might invoke elements of spirituality to mobilize public support. For instance, the famous Chipko environmental movement, which arose in the 1970s against deforestation in the Himalayas, took on a quasi-spiritual dimension in emulating M.K. Gandhi's celebrated revival of the longstanding Hindu principles of non-violence for the sake of anticolonial activism.[5] As in the case of Gandhi, Chipko raised its profile by linking itself to ancient moral rightness. Moreover, the Chipko movement became all the more compelling to the public because it espoused the empowerment of ethnic and caste minorities, as well as women, who had been marginalized and thereby left out of the environmental policies. In the spirit of Gandhi, such movements have instituted a kind of modern-day asceticism for a human cause — idealistic but not withdrawing from society. I suggest, then, that while the Indian public is broadly supportive of modern-day ecological concerns, this may be less of an overtly spiritual value than a socio-political or even nationalist issue cloaked in spiritual sentiment. It is not hard to envision protecting the Indian environment being framed as an urgent imperative to maintain the purity of Bharata Mata or Mother India.[6] Campaigns to clean up the Ganga and Yamuna rivers, goddesses in classical mythology, surely benefit from adopting such a nationalist tone.

Modern-day socio-economic sensibilities may guide ecological action, but the kind of worldview seen in Sankhya-Yoga philosophy still colors public perception. In fact, that early system of thought has found iterations in other Indic philosophical systems up to

the present. For instance, for centuries Advaita philosophers have theorized the material world as Maya, a feminized entity similar to Prakriti that obscures underlying spirituality from our consciousness. In this thinking, we must ascetically search beyond Maya to find the spiritual truth that is the true face of reality. From such a worldview, I infer a persistent ambivalence towards the material environment in Indic thought.

Empirically, it is virtually a cliché that unclaimed (or government-owned) open space in India tends to devolve into a public dumping ground. The uneven availability of public services in urbanizing India (garbage pick-up, for instance), along with widely perceived bureaucratic corruption and controversies around some governmental programs (such as the caste reservations system) have arguably complicated efforts to mobilize society towards the resolution of environmental problems. At the same time, a long-standing mindset that taking care of outdoor waste is best left for those of lower caste, traditionally deemed spiritually suited for such menial work, strengthens the perception that open land is somebody else's concern.[7] The mindset that Prakriti-Maya is not the ultimate reality that really counts anyhow may inscribe a spiritualized value system in which open space is no-man's land to be crossed over as fast as possible to reach a spiritual power spot, whether at home or outdoors.

Nonetheless, there are instances where a traditional religious ethic directly prescribes managing the physical environment. A good example is the Bishnoi religious community of Rajasthan, known for following 29 rules of conduct set down more than 500 years ago by their founding guru, Jambheshwar.[8] On the whole, these rules inculcate a spiritually pure lifestyle (not stealing, bathing

in the morning, offering prayers to Vishnu, etc.). A few rules are particularly ecological in intent, such as not cutting trees and preserving the natural environment as a practice of non-violence. Indeed, during occasions when I was in the company of Bishnois, they proudly pointed out to me the wild blue oxen that roamed their fields without fear of being hunted. This element of the Bishnoi doctrine is reminiscent of Jainism, which is famous in South Asia for espousing a lifestyle of personal purity based on strict vegetarianism and avoidance of violence (for instance, if one orders a pizza in a fast food restaurant in India, there is likely to be a "Jain pizza" option, meaning that absolutely no animal products were used in preparing it).

Scholarship has identified environmental resonances in some aspects of Hindu doctrine and practice, although that does not necessarily mean that environmentalism, as internationally understood, is necessarily central to Hinduism. As a reference point, I highlight Lance Nelson's edited volume on Hinduism and ecology, for which contributors have offered a wide range of starting points for considering ecology in Hinduism.[9] Although Nelson's introduction starts with the familiar observation that public spaces in India have been subjected to much unregulated dumping, he nonetheless calls on us to look beyond that to understand how the environment is variously imagined in Hinduism. Among the distinctly Hindu perspectives that Nelson examines is belief in karma. Can we re-imagine the problem of pollution as a moral responsibility with a consequence, thereby prompting action for the sake of our future? Another important tradition is non-violence, and the implication that we should serve as caretakers of our environment. The viewpoint that the events of our world are merely God's own whim or "play" is

another, provocative point. Would this realization absolve us of the need to take action, since it is all God's will? This stance in effect parallels the moral inevitability of *yugas* discussed earlier, whereby the state of the world is due to larger cosmic causes beyond our control.

Some of Nelson's points intersect with what I outlined earlier. For instance, he asks whether the Hindu doctrine that the whole cosmos is a single divine being, known as Brahman (akin to the concept of Purusha), should entail abandoning rather than conserving the physical world (i.e. Prakriti) for the sake of spiritual enlightenment. This issue is critical to my own suggestion that the ascetic tradition of transcending nature and the common practice of ritually attending to supernatural forces around us to some extent work against each other, or at least lead to divergent ecological conclusions. Taking the point further, Nelson asks whether the notion that the earth is a goddess (more commonly understood as Mother India, a personification of the nation) can be harnessed towards resolving some of India's environmental problems (that is, restoring her to ritual purity). Thus informed by the idea that Hindu thought can be applied to ecological action, I will now turn to the element of danger in the outdoors to ask how it also impacts a Hindu perception of the environment.

Managing Dangerous Environments

This discussion on the theme of danger will expand our scope of inquiry beyond scriptural Hindu tradition and its philosophical ideals to include the practicalities of worshiping the divine in everyday life. I would like to consider whether this particular worldview, which obliges one to pay ritual attention to one's

immediate surroundings, also prompts an ecological frame of mind. I will first discuss the presence of supernatural being as a normal component of the Hindu environment, which will lead into an extended exploration of pilgrimage as a religious act that brings together both physical world practices (involving shrines) and ascetic ideals. The final segment of this section will consist of my first-hand experience of danger in the setting of religious pilgrimage, which will lead to concluding remarks about ecological thinking in Hinduism.

Local village deities, the most fearsome of which tend to be goddesses (due to the belief that these deities are more volatile, hence in need of placating), have traditionally had the capacity to cause illness and other misfortunes if not properly revered. This is one obvious way in which danger enters the environmental picture. Sitala, the goddess of smallpox, is a famous example among many such deities; she is a deity suited less for abstract principles than for immediate need, inasmuch as she controls the health of the community.[10] Like most village deities, Sitala primarily receives worship from women, as they typically take responsibility for looking after the well-being of their families (including prayers for the safety of their husbands). Goddesses of this sort also traditionally receive animal sacrifices (although nowadays discouraged because of nationwide movements against animal slaughter). This kind of worship exemplifies another instance of danger. Even though smallpox has now been eradicated, goddesses of this sort continue to exert influence on many people's lives. So I propose to consider this worldview as also constituting environmental consciousness, in which the outdoors has a fearsome element, compounding the ascetic perception that it distances us from ultimate truth.

Historically, many fierce goddesses were incorporated into the brahmanical pantheon, which demonstrates how the danger of the environment has entered into scriptural Hinduism. In early Hindu iconography, the Matrkas — the Mothers — were female deities with the power both to protect and inflict harm, like Sitala and similar deities.[11] The goddess Durga, who has a lofty mythological role as Shiva's consort, is in effect a representation of the various warlike goddesses that were historically embraced as the kuldevis or lineage deities of warrior kings. The fact that she is female does not detract from her ability to lead men into battle. Indeed, since divine power or *shakti* is thought to be fundamentally female (commensurate with Prakriti and Maya), these female deities are in other words manifestations of the active, sometimes violent animating power that is inherent in the universe. And while Shakti (personified as a goddess) and similar goddesses is often loosely matched with Shiva, they are normally worshiped as single deities, for it is in this form where their raw power is at its greatest — not neutralized by having a consort.[12] And so, I argue, if we are going to envision the environment in such terms, we need to take into account not only the devotional tradition that informs daily religiosity but also underlying ideas about the ambiguous or spiritually contested nature of that space.

Spirit possession, a well-known phenomenon in many Hindu locales, is another clear instance of danger in the environment. The existence of possession makes clear that the environment around us is unstable, inasmuch as it could take a malevolent form and invade us at any time, even for seemingly innocuous reasons. For instance, a young male devotee at a Hanuman temple recounted to me that he was walking there on a

multi-day foot pilgrimage from his home village when he overheard a young woman on the road call out to a companion to bring her something. Because she unthinkingly made this request at an intersection on the road, she was susceptible to spirit attack, as spirits are known to linger around such places. Her possession became evident when she thereupon started to curse in a strange, angry voice. When her companions dragged her to a makeshift Hanuman shrine at a rest stop, she became peaceful again, but upon their departure the demonic symptoms returned. When they reached the outer gates of the temple itself she again grew quiet, as the god had subdued the spirit, but she resumed her behavior after they left the temple. This common scene points to the ontological uncertainty of the environment; it holds dangers, but if we reach a sanctified spot or a person who has supernatural healing powers, the bad effect may be temporarily or permanently removed.

If anything, possession has nowadays become more, not less, common in much of India. The region of my research, the countryside of Rajasthan, has virtually exploded with faith healers who proudly declare that their reputations for efficacy attract a clientele from far and wide. One could say that we are witnessing a collective enchantment of the environment. These healers and their clients reify a perception that Rajasthan is a kind of holy land of saints and shrines, which has helped to preserve spiritual efficacy not found in the modern urban setting. The harsh desert setting purportedly enforces an ascetic disposition in the local culture. Exorcism services there have been spurred by the rise of the moneyed middle class and improved transportation networks. Returning to the theme of danger, these sites for exorcism exemplify how unstable,

threatening public space is kept at a distance within the confines of these healers, who set up shrines in their homes to receive those in need of treatment. They typically prescribe various devotional practices for clients to carry out at home to supplement the work done in the presence of the healer. In this way, both devotion and danger are integral to the client's subjective experience of affliction and recovery.

Healing shrines are essentially one kind of pilgrimage destination, which, as I suggested early in this essay, very clearly engages with both devotion and danger, as one passes through the former in order to arrive at the latter, which offers divine protection. From an environmental standpoint, pilgrimage is probably the ultimate example of environmental consciousness embedded in Hindu religiosity. Scholarship has amply explored Hindu pilgrimage from practically every perspective. For the purpose of this discussion, I will only just highlight the phenomenon of linked multiple shrines, which in a sense inscribes the cultural viewpoint that the land of the entire region constitutes a sacred field. Ann Feldhaus (focusing on Maharashtra), Kathleen Erndl (Jammu-Himachal Pradesh), and James Lochtefeld (Uttarakhand). Such pilgrimage could be seen as a precursor to environmental consciousness, as one sees the interrelatedness of power spots. These are, in effect, like spiritual versions of national parks.

For imagining an incipient environmental consciousness in pilgrimage, I would also call attention to the work of Victor Turner, who theorized pilgrimage as a universal process of personal transformation.[14] Turner suggested that in encountering physical challenges, which I construe as "danger," or entering

unfamiliar territory on the road to the shrine, one is temporarily isolated from familiar everyday life. This places the individual into a "liminal" state (distanced from normal reality), in which one's normal sense of self is imprinted with the religious rituals and symbols of the specific event (e.g. journeying through wilderness while maintaining a devotional frame of mind, following vows, or carrying out certain ritual acts). This process of removal from the normal world, which I would equate with asceticism's cognitive re-engineering to enlightenment by distancing the adept from conventional life, produces an enhanced, even new, sense of identity and purpose that incorporates the values of attached to context of the event. So, like the ascetic who meditates to the point of denying all external stimuli outside the controlled setting (in a cave or other special place), the pilgrim discovers God in the ascetic-like context of the journey into danger.

This is not to say that in the Indian cultural context pilgrimage always follows Turner's model. For instance, writing before Turner, Irawati Karve documented the persistence of separate caste and gender protocols throughout pilgrimage.[15] William Sax has written of the local politics that can easily subvert the community's sense of common meaning in carrying out pilgrimage.[16] So, Turner's model is simply a starting point, which I will amend with the specific empirical content of a particular Hindu pilgrimage in mind. Even within Hindu pilgrimage, I will limit the discussion to journeys where some level remains, even in this modern era. In my main area of research, Rajasthan, pilgrimage was formerly much more arduous than it is now, when anyone can go overnight from a city like Delhi. India's mountain shrines remain a better example of actual physical

exertion, and in some instances even risks to one's well-being, so I will now turn to that venue to illustrate the potential encoding environmental awareness in Hindu pilgrimage.

In the Western context, there is reason to think that some people find a new sense of self, or at least appreciation for nature from a wilderness adventure. To see what sort of outcome could be obtained from the Indian equivalent, I will recount my personal observations on the Shrikhand Yatra, a Himalayan pilgrimage in the state of Himachal Pradesh. It is said to be among the more arduous and physically dangerous pilgrimages in India. High above the narrow gorge of the Sutlej River, the exquisite wooden temple of the fierce goddess Bhimakali in the village of Sarahan long served as the ritual power center of the former kings of this region. Bhimakali is a prime example of the kind of local deity that formerly demanded sacrifices as the price for protecting the kingdom. On the other side of the valley looms the mighty peak of Shrikhand (17,000 feet high), which is regarded as one of the abodes of Shiva, the divine patron of ascetics. These two deities — Bhimakali and Shrikhand, as local manifestations of pan-Indian deities, Shiva and Shakt i— are nodes of spiritual power that anchor the sacred topography of this land. While visitors arrive at Bhimakali at any time of the year, Shrikhand is really only accessible during the summer. Even so, I discovered, there is still much snow at the higher levels, and the journey risks death at seemingly every turn. But the locals insist that anyone who keeps faith in the god of the mountain throughout the journey will come through unharmed. Hence, the pilgrimage fits the dual themes of devotion and danger that has been the focus of this study. In following, I provide an abbreviated first-person account.

Some of the youths from Sarahan whom I had befriended told me of the annual *yatra* [pilgrimage]. The full moon would be shining on the final night of the one-month *yatra* period, when the supernatural power of the land was at its greatest. Having visited other pilgrimage sites, I readily agreed to join them. As they told me, during this time each year many villagers from the surrounding area, especially young people on college break, make the journey to pay their respects to the god of the mountain. An additional point made clear to me was that it was something of a youth adventure, with groups making the trek for the sake of the physical challenge, and to socialize with others on the road.

The journey started with a bus ride along a narrow, winding road carved into cliffs. I reflected that even a slight miscalculation by the driver could send us down the gorge. Having alighted at the trailhead, we had a long day ahead up the steep forested mountainside. I soon found out that of the two main paths of ascent, we had chosen the one that is less used, and so we were virtually on our own. The small path frequently forked into numerous directions; it seemed that we would soon be lost in the forest. That was my second moment of reflection on our mortality. Moreover, once on the path, my rubber sandals started to break; awkwardly flopping along the muddy path, I considered that circumstance would force me to emulate the ascetics who often make the journey barefoot.

As evening turned to night, it began to rain hard. We had no rain gear, as my young friends considered this journey to be a test of their unencumbered faith in the god. Was I foolish to think I could survive with that mindset alone? I was wearing only a tattered thin windbreaker over my light cotton clothes from the plains. I had a small blanket and some tee shirts in a daypack. My friends assured me that a tent had been set up by volunteers to accommodate pilgrims, but as we walked through the icy rain we initially found nothing. I started to vocally doubt that we had chosen the right path in this dense forest, wondering how we could survive like this. Then we came across a large dimly lit tent packed with pilgrims huddled under their blankets.

Exhausted, I negotiated a narrow space wedged between two pilgrims and slept in damp clothes for the night. Early in the morning, after a plate of rice and lentils from the tent volunteers, we headed up a steep ascent through alpine grass, boulders, and wildflowers. Being a foreigner with a camera, I frequently stopped to take pictures. My companions seemed impatient with my lack of urgency to reach the summit. They had only one objective, which I soon realized was the dominant mindset among pilgrims here: get to the top as quickly as possible, see the god, and then rapidly descend to return home. My dalliance showed that I was out of sync with this ethic of focusing predominantly on the charisma of the deity, and I was not sufficiently appreciating the competitive dimension of racing ahead.

I soon lost sight of my companions, and never saw them again. Despite the apparent risks in being alone on the mountain, I felt liberated. Fortunately, by this point the other, more populated path had converged with the one I took, so I met others on the path. As afternoon came, I had reached a ridge, but it was drenched in icy fog. The path zigzagged between huge boulders perched at the edge of cliffs dramatically plunging beyond what I could see. Danger soon appeared in a new form, as the path passed through several glaciated sections at a steep incline. Walking barefoot because my sandals had become useless, I cautiously stepped in the footprints of pilgrims in the ice, hardly daring to look downhill, for if I slipped there would be no coming back from the steep icy slope.

At the other end of the glacier I sat on a rock and furiously pounded my numb feet. Sadhus in orange robes and middle-aged Himalayan village women passed me by without showing weariness. The occasional pilgrim from afar — perhaps Kolkatta or Hyderabad — cheerily waved in passing. There was no going back, I reflected; either I was one of the chosen, or I would soon die. Could I, a skeptical Westerner, put my rational doubts aside and surrender to this higher power? I feared I would have to answer for my faithlessness, but I did my best to externally perform as socially expected. When pilgrims encountered each other on the path, they would call out: "Om namo Shivaya … Jai Mahadev … Bom bom Bhole" — all versions of "Hail, Lord!" We uttered these words with the utmost vigor, as if to assure each other that we would all be all right in the end.

That evening I arrived at the next accommodation, which was a small plastic tarp pulled over an indentation in the cliff to keep the wind out. This was the men's tent, as I was told that the women were given a different tent. Despite the long hard walk, the mood was upbeat. The men smoked ganja [hashish] and shouted out God's various names. Of course, Shiva, the lord of the mountain, was the ultimate ganja-smoking sadhu, and so they were perfectly in line with the ascetic quality of this devotional undertaking. In the morning it was time for the final ascent, which I was told would be very risky. The proprietor of the tent advised that after reaching the top I should just come back down to this tent, as the other side was much farther and at least as dangerous.

Initially thinking I would follow this advice to return to the same camp, I set off, but starting to walk across the first glacier at a near vertical angle and observing that the glacier sloped to the edge of a cliff far below, I decided that I would rather take a chance with the other side than come back to this peril a second time. After all, I observed, the other pilgrims seemed to be confident in going the other way. Before going any further, I returned to the camp to get my gear. By the time I had started a second time, it was already afternoon. I was warned that I might not make it to the top by evening.

Feeling that maybe if others could do it, so could I, I decided in that moment to try again with faith in that god of the mountain. I set off alone back across several glaciers. As I was now late, there were no people on the

> path, which soon petered out, leaving me to scramble for footprints to find the way. Soon I was reduced to hoisting myself over rocky outcroppings on the cliff, which was around twenty feet wide. On each side of this rocky cliff precipitously steep glaciers hundreds of feet wide plunged far below into the foggy gloom. At this point, I felt that I had run out of luck. I was climbing into oblivion, absolutely lost to humanity. I thought of the mountain deity again, and tried to invoke his name with as much earnestness as I could muster.
>
> Before long a visible crack opened up in the fog, and I could see tiny ant-like figures high over me on a ridge. I still had far to go, but I kept clambering up the cliff over the rocks, and after a while came to a dirt path that ran along the ridge. People started to appear. I would live, at least until the next danger. The final ascent involved walking up a field of snow to a lingam-like boulder at the summit — the shrine itself. The rock shrine had been festooned with hundreds of small metal tridents — Shiva's symbol — along with numerous red flags or headscarves that pilgrims had left as a token of devotion. However, there was little time to relax, and many more dangerous passages over several days awaited us on the even longer descent down the other side of the mountain.

I bring this narrative to a close with some thoughts about what I learned from this passage into devotion and danger. At first glance, as a foreign visitor who was not personally invested in the cult of the god in the same way as locals, I could be said to have passed through what Turner called a "liminoid" rather than

liminal experience.[17] The theoretical distinction is that whereas liminal suggests that the subject is prone to cultural "rewiring" in the setting of some religious activity such as pilgrimage, a liminoid experience refers to the context of Western, industrialized, secular culture. In the liminoid context, people may feel renewed vigor or meaning in being removed from normal life (as on a wilderness trek), but they do not necessarily subscribe to the full supernatural potentiality therein. From an environmental perspective, a limnoid experience would be in line with a secular international conception of ecology, while a liminal experience would frame the event within a religious viewpoint. I will draw from both of these perspectives to discuss the different ways in which I and locals experienced this journey into the outdoor environment.

To my cohort, by and large, the natural setting was not the main event. Meeting with the god was the actual objective. Journeying through danger was the test that one needed to pass to prove faith in the god, and survival demonstrated the veracity of that devotion. Each devotee was operating by two kinds of relationships. On the one hand, an invisible cord — the devotional relationship — drew the pilgrim upwards to the waiting deity. The other relationship was with the pilgrim's companions on the road, who made the journey a continuation of their normal social life at home. Seen from that angle, the pilgrimage was less of a liminal event than one might have surmised. Working against the danger of the chaotic outdoors, the pilgrims maintained a continuous performance of reassuring calls and banter. Theorized in this way, it makes sense that most locals feel that one should just get to the shrine at the top as soon as possible, and then back to the safety of home.

A foreign visitor like me, stopping to marvel at the environment as an attraction in its own right, is a bit of an oddity. Moreover, I have theorized the Hindu outdoors, especially as seen in this pilgrimage, as a site that is ontologically ambiguous because it brings together both dangerous elements and the means for emancipation from them. If one fails to properly revere the presiding deity on the way — the being that keeps the forces of chaos at bay — then one may fall victim to those other supernatural forces. After all, we live in the Kali Yuga, and so it is imperative that we make an extra effort to bring ourselves close to God, and to cultivate God in us through devotional performance.

Returning to the earlier philosophical model of Prakriti and Purusha, it can be seen that the pilgrimage to Shrikhand evokes a kindred mindset. Nature is a dangerous or at least uncertain place that would obscure divine truth from us if we do not strive to move beyond it through practices of personal purity such as pilgrimage. While attracting people of all backgrounds, the Shrikhand Yatra in particular appeals to young men, who at that time in their lives are well suited for an ascetic endeavor like this, going far from their homes and embracing the God of sadhus. Certainly, there are other pilgrimage shrines that receive family groups, more so in this era of improved transportation. Indeed I venture to say that in all these Hindu pilgrimage performances, as in the Shrikhand Yatra, the primary focus is on the devotional community being produced — linked shrines, deities, family groups, friends on the road, ascetics and their assistants — rather than some kind of aloof appreciation of nature.

Therefore, inasmuch as scholars may document instances of nascent ecological awareness in the Hindu tradition, I would ask whether those instances are environmentalism in the contemporary worldwide sense of the term. Moreover, in this era, while the Indian public vigorously supports various social movements that have environmental ramifications, I would caution against projecting an international environmental ethic onto a particular cultural setting in which local socio-economic inequalities are also animating factor. In short, I think that there is more room to raise environmental awareness in India, as in the West. Very likely, as Gandhi and others have found in past movements, finding a religious justification will strengthen the movement amongst the Indian public. But the environment itself offers a diverse mix of experiences to affirm and also to avoid.

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[1] For an overview of Sankhya-Yoga philosophy, see Mysore Hiriyanna, pp. 106-128. Also see A. K. Majumdar for an overview of the Sankhya teaching on cosmic evolution.

[2] Hiriyanna, p. 111, illustrates this evolution as a process in which intellect and matter arise from the same primordial phenomenon. For instance, he describes the evolution of such cognitive qualities as *mahat* or "intellect" and *ahamkara* or "egoism" from Prakriti. Our mental faculties and the physical components of the world are both developments of these initial stages.

[3] For a good review of the various ways in which Indians interpret the Kali Yuga in terms of current-day life, see the 2014 issue (Vol. 26, No. 1) of *Nidan: International Journal for the Study of Hinduism.* For a discussion that covers some of the points brought up in this essay, see Saul (2014) in that issue.

[4] Jeremy Saul (2013).

[5] Among the many studies of this movement, consider P. P. Karan and Michael Dove. See Farah Godrej for a discussion of Gandhian correlations.

[6] Sumathi Ramasamy has traced the development of the cult of Bharata Mata in terms of visual culture, bringing together nationalism and piety rooted in the Hindu classics.

[7] Of course, animals (dogs, pigs, and cows) wandering the streets have traditionally provided an adequate means of waste disposal, which could work against innovation. Furthermore, as everyone knows, the cow has been regarded as a physical manifestation of the divine mother that gives us sustenance in various forms (milk, yogurt, labor, dung for fuel and so forth), and therefore should be worshiped. Such respect for at least some animals constitutes another incipient line of environmentalism.

[8] Research on the Bishnois is still relatively little developed, but see Gold for a discussion of environmental awareness in the history of a village in the Rajasthan region.

[9] Especially, see Nelson's Introduction, pp. 1-10.

[10] Babagrahi Misra provides a concise study of this goddess.

[11] David Kinsley, pp. 151-160, gives an overview of these goddesses within a larger study of all categories of Hindu goddesses.

[12] M. J. Gentes vividly observes the violence and supernatural heat of village goddesses, particularly evident in the hot season, in a study of a goddess shrine in a town in Kerala.

[13] In addition to these studies, David Sopher's earlier article usefully explores pilgrimage as a practice of visiting a circuit of ritually linked shrines.

[14] Turner (1973) frames pilgrimage in terms of a kind of social transformation, as pilgrims form bonds from the share experience of physical challenge on the pilgrimage path. Earlier (1992 [1969]), he had theorized a link between these bonds and the shared experience of ritual isolation; see Chapter 3.

[15] For instance, Karve notes the persistence in pilgrimage of restrictions against eating with strangers, who might belong to other castes.

[16] Sax describes local political jealousies over which devotional community has the right to lead a mountain procession for a goddess.

[17] See Turner (1974), pp. 170-171.

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Understanding the Challenge of Global Warming in the Light of the Qur'anic Idea of Earth as Our Only Planetary Home[1]

Osman Bakar

Introduction

Global warming and climatic change are two closely related phenomena concerning the present condition of our planet Earth. These phenomena are of deep concern to scientists, who first identified their origin decades ago and then kept on monitoring their worsening development as well as to many ordinary people and civil society groups who, thanks to the growing information provided by the scientists themselves, are becoming increasingly alarmed at the deteriorating health of our planet. The concern with our planet's health deepens as more and more people begin to realize that if the causes of these phenomena that are basically rooted in the unhealthy patterns of human consumption and lifestyles remain unchecked, then global warming and climate change could only worsen, even to the point of making the Earth no longer a safe home for the human species. But then, as maintained in this article, there is no alternative home to our planet Earth for humankind.

Of the two phenomena in question, climate change is the more specific and particular. Climate change is an ecological and more particularly a physical consequence of global warming. Global warming is generally understood as referring to an increase in the Earth's average atmospheric temperature that

causes corresponding changes in climate. While global warming is the cause of the Earth's climate change, it is itself caused by the greenhouse effect, which is an important aspect of the planetary ecological crisis. Serious attention therefore needs to be given to this crisis. The roots of this ecological crisis are undoubtedly human, as amply demonstrated by the many serious studies that have been done on the subject. It was in the 1960s that a pioneering study on the subject of the human roots of the environmental and ecological crisis threatening global humanity was undertaken by SeyyedHossein Nasr, a world leading Muslim scholar in comparative religion and spirituality. In a book originally titled *The Encounter of Man and Nature: the Spiritual Crisis of Modern Man,*[2] Nasr provided a detailed discussion of the spiritual and intellectual roots of the environmental and ecological crisis that required him to explore the rich heritage of the world's religious and spiritual traditions in environmental and ecological wisdom. In speaking of the spiritual and intellectual roots of the ecological crisis, Nasr has thus traced its human roots to its very core, for there could not be any deeper human aspect than the spiritual. As asserted in all religious traditions, the spiritual is the very core of all that is called human.

More recently, His Holiness Pope Francis wrote an encyclical letter titled *On Care for Our Common Home*[3] that also treats the theme of the human roots of the contemporary ecological crisis. Many of the fundamental ideas about human nature and the human condition discussed by Nasr in *Man and Nature* were discussed in Pope Francis' treatise.[4] However, written nearly half a century after Nasr's work was published, Pope Francis was able to benefit from more recent scientific and religious-philosophical works on the ecological crisis not

available to the former -- the kind of detailed knowledge that would further impress upon contemporary humanity the precariousness of our planet Earth. But the fact that despite our increasingly better knowledge of the Earth's ecology and the conditions necessary for safe habitation of the human species, the planet's health continues to deteriorate, clearly showing that the ecological crisis with all its physical manifestations such as global warming and climatic change is a much deeper human problem. It is more than just an economic or scientific and technological issue. In this respect, since the works of Nasr and Pope Francis touch on the deepest roots of the modern ecological crisis, they remain ever relevant to the search for real solutions to the crisis. For both men, the deepest human roots pertain to man's spiritual relationship with God and nature. It is this relationship that largely determines man's traditional appreciation of nature.

Although in their respective works, Nasr and Pope Francis dwell at great lengths on the spiritual roots of the ecological crisis as well as its intellectual dimensions, thus displaying many commonalities between them – a point not to be lost by those interested in securing a united action aimed at making the Earth a safer home – Nasr is more comprehensive than the Pope insofar as the treatment of the intellectual roots of the crisis is concerned. Pope Francis maintains the view that the traditional appreciation of nature, which combines the spiritual and the scientific, has been lost, which is one good reason why the crisis has happened. But he argues that the continuing absence of this traditional appreciation proves to be a major obstacle to effective educational programs on care for the planet. A scientific or materialistic appreciation of nature alone would

not be able to help sustain the Earth's health, as the last two centuries of modern man's exploitation of the Earth have clearly shown. Nasr shares the same view with the Pope on this point but elaborates more on the meaning and significance of the traditional appreciation of nature and the historical and intellectual causes of its disappearance. In Nasr's exposition, we find that, for example, the spiritual and the scientific appreciations of nature are not just complimentary but also epistemologically interrelated. He traced the harmony of the spiritual and the scientific dimensions of nature – and more generally the harmony of spirituality and intellectuality – to the Quran itself. Moreover, Nasr views this harmony as having a direct bearing on the way Muslims have been traditionally doing and applying their science; in other words, a direct bearing on the Muslim conceptions and appreciation of science, which in turn influence their appreciation of nature.

As to why the traditional appreciation of nature has disappeared in modern times, Nasr has offered a lengthy discussion of the historical and intellectual causes. Of great interest to us is the intellectual causes, of which the victory of the new Copernican heliocentric theory over the old geocentric theory may be viewed as perhaps the most important and certainly the most consequential in successfully influencing and indeed changing the ordinary people's perceptions of the significance of the Earth to their beliefs and thoughts.

The feud in the aftermath of the post-Copernican revolution (seventeenth century onwards) between the respective defenders of the two theories was an important episode in the history of Western thought that offers many lessons to anyone interested

in finding a more cordial relationship between religion and science. We would like to discuss briefly in the following section how the victory of the heliocentric theory had resulted in the gradual loss of the traditional appreciation of the planet Earth.

The Heliocentric Theory and the Degradation of Planet Earth

From the point of view of modern man, who in the days of over-excitement at the victory of science over religion in Europe overthrew the geocentric view of the world in favor of the heliocentric view, the planet Earth has lost its uniqueness. He sees science as showing him very clearly that the Earth is no longer the physical center of the universe as previously believed. The sun has taken its place as the center.[5] For modern man, however, it is not just the Earth that has lost its uniqueness. Man too, who was traditionally viewed through the religious prism as not only the best creature on the planet but also in the whole universe, has lost this cosmic status and thus also his centrality in the cosmos by virtue of the degradation of the Earth into an "ordinary planet" just like any other.

The seemingly naïve but quite current argument in the modern West in the aftermath of the so-called Copernican revolution[6] was that if the Earth has lost its centrality in the cosmic order, then man too, who is traditionally believed to be its best creature – indeed the only creature created in the total image of God, as believed by Judaism, Christianity and Islam – would have to lose his centrality in the whole of creation. In the thoughts of many modern men in those days, the standing of

man in the cosmic hierarchy of the creatures was inextricably linked to the cosmic significance of the physical location of the planet Earth. Their assumption was that the centrality of the human being was closely tied up to his or her cosmic position. From the point of view of spiritual or metaphysical anthropology, however, a human being always remains a theomorphic being no matter where he or she is situated.

For many modern men, the heliocentric theory signified the "Second Fall" of man, the first being in reference to the biblical fall and expulsion of Adam and Eve from the Garden of Eden. Their belief was such that it was as if man had to lose his theomorphic status just because scientific knowledge had proved that his planetary residence was no longer at the center of the universe, physically speaking. In popularizing the heliocentric theory, its modern interpreters and propagandists further overinflated its significance to the point of damaging the integrity of both religion and science, when he also interpreted it to mean that there was nothing unique about the planet Earth. The general impact of the Copernican revolution on the modern mind has been considerable, with its negatives arguably far outweighing its positives. The heliocentric theory provided an impetus to the radical transformation of modern Western man's view of himself, his appreciation of the planet Earth, and his vision and appreciation of the rest of the known universe, particularly concerning the presence of extra-terrestrial life. He sees himself as a purely terrestrial being, albeit still viewing the species to which he belongs as the "best" of all the earthly creatures in accordance with his scientific criteria. Paradoxically, the more terrestrial he imagines himself to be in his creaturely nature, the greater is his urge to travel to the heavens and explore

them, purportedly among others looking for other life forms that are as intelligent as humans if not superior to them. However, the harder he seeks to disprove his uniqueness and the uniqueness of his planetary residence, the more he accumulates evidence and arguments that seem to affirm the uniqueness.

Since his worldview does not entertain the idea of an afterlife beyond the present terrestrial one and the idea of the end of the world as we know it, he is content with viewing the planet Earth as his permanent home, notwithstanding his keen interest in inter-planetary travels and celestial explorations. He developed new perspectives of looking at his relations with his planetary home. He cut off relations completely with the creator and owner of the home when, in fact, he is only a temporary trustee of the home. He develops, renovates and remakes the home as he wills, abandoning all conditions of trusteeship and all the guidelines provided by the home's creator and owner to ensure its preservation, safety and comfort.

Although he gains a new vision of the universe, including of himself, thanks to new frontier knowledge in modern cosmology largely made available by sophisticated state-of-the-art astronomical instruments and space technology, he has lost his traditional holistic view of his planetary home, as clearly demonstrated by his new beliefs about the Earth and its significance in relation to the rest of the cosmos. Nonetheless, his radically transformed cosmic beliefs help generate a new optimism in his thinking and attitudes concerning the future of the planet Earth. He believes that with his newfound liberation and freedom from the dictates and constraints of religion in the pursuit of life and knowledge and with his newfound philosophy

of development and progress that is given practical shape by ever newer forms of technology, he would be able to make his planetary home a progressively better one – more comfortable, more prosperous, and a happier place to live in.

However, both beliefs of modern man – first the belief that the Earth is just an ordinary and not the most special or unique planet in the cosmos, and second the belief that with the aid of science and technology man can eventually create "paradise" on Earth – sought to be justified in the name of science and technology itself, have been shattered in our own times, interestingly enough as a result of being undermined by twentieth century scientific and technological progress. To summarize, we may assert that the victory of the Copernican heliocentric theory resulted in the loss of old beliefs about the relationship between man and the planet Earth, and their replacement with new ones. Lost was the belief in the uniqueness of both man and the planet Earth. Gained were modern man's new perspectives of looking at his relationship with the planet Earth. The long-term consequences of these new perspectives for our planet Earth are now there for all to see. To many critics of the modern perspectives of viewing man's relationship with nature in general and with the planet Earth in particular - among whom Nasr and Pope Francis are the most prominent - the consequences could only be described as destructive both to the planet and the human species inhabiting it. They harbor the hope that the combined spiritual and scientific appreciations of the planet Earth will be restored, promoted and advanced through an enlightened and effective ecological education at all levels for our times.

The Earth as Man's Ideal Home: The Quran's Perspectives

The main purpose of this section is to discuss Quranic teachings and perspectives on the idea of the Earth as a human home. The focus is, therefore, on the uniqueness and special features and conditions of man's planetary home before it was substantially damaged by many of its occupants. In other words, we are interested in knowing why, in the view of the Quran, the planet Earth is the only suitable place for our home. The implications of this Quranic teaching on the cosmic significance of the Earth for its ecological and environmental future are very obvious. The present and future well-being of man's present home will depend very much on the quality of his guardianship of the Earth's environment, which in turn depends largely on the extent and quality of his appreciation of the Earth as his temporary home. It is to be emphasized here that from the point of view of the Quran the Earth is both unique and temporary. Unique here means that the Earth is not one of several possible planetary homes for the human species to be found in the whole physical universe. Rather, it is man's only planetary home.[7] And temporary means that the Earth is not everlasting. At "some point in time" it will cease to exist.

Both the uniqueness and the temporal nature of the Earth have practical implications for man's duties and responsibilities to this planet, both as individuals and as members of communities at various levels, beginning at the local level and moving right to the global level. However, the scope of this article does not allow us to treat the perspectives of the Quran on the issue of planetary care and planetary responsibility in detail. Our main concern here is how we can help develop a deeper appreciation

of the Earth as a divinely ordained planetary home for humankind than what we have now.

From the point of view of the Quran, the physical uniqueness of the planet Earth is a dictate of God's plan to make it a special home for His most special creatures, namely the human species. Before describing God's planetary home plan for man it would be useful to first explain who this special creature is. In a sacred hadith,[8] we are told that God created the universe because He wanted to be known. This means that every creature participates in an act of knowing God or has some form of knowledge of Him. It is not specified in this hadith which particular creatures in the whole of creation will have the honor and privilege of being His best knowers. However, it is clear from the Quran that the best creature in question is man (*insan*) or the Adamic species. Nevertheless it is a prophetic hadith that best explains why this is so. This hadith tells us that God created Adam, the first man, in His form. By virtue of being created in His image man is endowed with God-like attributes and qualities. One of these attributes repeated again and again in the Quran is the All-Knowing. If man is the best sentient being in the universe, metaphysically the reason is because he is created in the image of the Al-Knowing. But unlike other species of knowers such as the angels, man is a theomorphic being in a complete and integral manner.

The whole of creation may be divided into two parts. One is the cosmos external to man, which classical Muslim scientists and philosophers call macrocosm. Another is man himself, which is traditionally seen as a universe by itself and which they call microcosm. By knowing the macrocosm and by

knowing himself, which is the microcosm, man may know God. In the divine plan or in God's knowledge, man the microcosm appears in principle before the macrocosm, but in the created order the macrocosm is prior to man in its manifestation, since God created the cosmos for him. As a creature that essentially embraces the whole of the cosmos, man necessarily appears the last in the order of creation. In this connection, the Quran refers to the very long time span separating the first manifestation of the macrocosm[9] and the creation of man as follows: "Has there not been over man a long period of time (*al-dahr*) when he was nothing – (not even) mentioned?" This verse has been understood by classical Muslim scientists as referring to the long cosmic, including geological history preceding the appearance of the first man on the planet. Geological history itself spans a long period of time as mentioned by al-Biruni. On Earth itself by virtue of his microcosmic constitution, man appears the last in the chain of inorganic and living forms.

The idea of knowing God as the main purpose of divine creation is not explicitly mentioned in the Quran. However, according to many traditional interpreters of the Quran, it is alluded to in the verse, "And I did not create jinn and men except that they may serve and worship Me."[11] A popular Sufi interpretation of this verse is that the whole purpose of man's service and worship of God is ultimately to know Him. In other words, there is a higher purpose of creation than mere worship, which is none other than knowing the object of worship. The Quran affirms in many other verses, directly and indirectly, the supremacy of knowledge over many other attributes and the position of man as the best knower among all the creatures. According to one verse, God taught Adam the names of all

things.[12] Many interpreters understand this verse to mean that man is endowed with the capacity to know the natures of things and thus to have mastery over them. Sufis like Ibn al-'Arabi understand it to primarily mean that God taught Adam all His beautiful Names through which alone man can know Him. Both interpretations are correct and both convey the idea of man's uniqueness. This distinctiveness of man qualifies him to be appointed God's vicegerent (*khalifah*) on Earth. It is significant that this distinctiveness of man follows immediately after the verse in which God addressed the angels as follows: "I am about to place a vicegerent (*khalifah*) on the Earth."[13] God informed the angels about man's placement on Earth, because they are His most obedient functionaries responsible for administering and regulating the cosmos with precision. It is to be noted that the angels constitute a distinct species of knowers of God and the cosmos.

God's vicegerent was Adam, understood here both as an individual person and as the generic name for man. So Adam became the first man to have lived on the planet Earth. He was also the first Prophet of God, because he was the first human recipient of revealed knowledge from God. By virtue of having the knowledge of the names of all things, part of which is not known to the angels,[14] Adam was honored and dignified with a creaturely status that is superior to the angels and the rest of creation. God wanted to honor the human species above all other creatures, and His chosen way of honoring and dignifying them is to place them on the planet Earth, which He has blessed with innumerable favors, bounties and facilities. He also created man fully equipped with the necessary faculties of intelligence, desire and choice that are needed to make the best possible use

of these divine gifts. He has truly made the Earth exceptional as a planet of super abundance in every respect for the sake of its human dwellers, for He says in the Quran:

> And We have honored the children of Adam and provided them with transport on land and sea. And We gave them for sustenance things good and pure and conferred on them special favors, above a great part of Our creation.[15]

In the following verse, the Quran mentions the ship as an example of sea transport, and speaks of the nature of this transport and the purpose of its creation:

> Your Sustainer is He who causes ships to move onward smoothly for you through the sea, in order that you may seek of His bounty. Verily, He is unto you Most Merciful.[16]

We know that apart from natural modes of transport as provided by such animals as horses, camels, mules, buffalos and various other kinds depending on the geographical regions, all transportation modes are human inventions. In the seas, we have boats, ships and submarines; the first two moving on the water and the third underwater. On land, we have cars, buses and trains. In the air we have planes. Although with the exception of boats and ships all these land, sea and air transport modes were not yet invented by man when the Quran was wholly revealed, this last divinely revealed book to humankind makes allusions to them. The Quran anticipates future transport through the use of the phrase "of similar type on which they ride." One of the verses referring to Noah's Ark[17] is immediately followed by the verse,

"And We have created for them similar (vessels) on which they ride."

The Quran emphasizes the idea of the Earth as man's ideal home in several other ways. It describes the Earth using terms that we normally associate with homes. The Quran's first mention of the Earth as man's only planetary home occurs early in its second chapter:

> (God) Who has made the Earth (*al-ard*) your couch (*firash*), and the sky (*al-sama'*) your canopy (*bina'*); and sent down rain from the sky; and brought forth therewith fruits for your sustenance (rizq); then set not up rivals unto God when you know (the truth).[18]

This verse is significant to our discussion on our common planetary home in a number of ways. First, it is addressed to the whole of humankind, since it appears immediately after the following verse: "O humankind! Worship your Guardian-Lord (*Rabb*) Who created you and those who came before you so that you may attain righteousness."[19] This verse seeks to remind all human beings that no matter to which branch of the human family they belong, they have one and the same Guardian-Lord, namely God the One, and they also have the same ultimate purpose in life. This purpose is the worship of God the One alone, which the Quran identifies in another verse with the purpose of human existence[20] and in yet another with the "straight path" (*sirat al-mustaqim*).[21] As guaranteed by God Himself, if man were to truly live in accordance with the purpose of His creation – that is, as His servant (*'abd*) worshipping

and serving Him faithfully and sincerely – then he is sure to undergo an inner self-transformation that would result in him attaining the enlightened state of God-consciousness, piety and righteousness.

Second, this enlightened state in man would be good for him personally and for his spiritual relationship with God, as well as for his manifold relationships with his fellow human beings. Last but not least, it would be good for his relationship with the natural environment. Traditional Islamic wisdom on man's relationship with nature[22] conveys the precious message to humankind that all life forms on Earth greet with joy the saving knowledge in the hands of spiritual men leading saintly lives, because such knowledge would mean that they too will be saved from human destruction and fates other than what God has ordained for them.

Lest man is stubbornly disobedient to this general command of God or lukewarmly obedient to it, he more than deserves to be reminded of the origin of his own existence and the numerous favors which He has continuously conferred on him and the whole human family, from the first to the last of them. From the point of view of the needs of the human family as a whole in their present life, there could not be more fundamental favors conferred on them than the special home, namely the planet Earth, which God has built for them. Since humankind live on the planet Earth and they are its most intelligent and most dominant living species, it is about the significance of this planet that God seeks to address to them.

Moreover, humankind as a species tend to easily forget who actually owns their planetary home and keeps it secure and plentiful in resources for their needs, having sustained it for millions of years since its birth as a full-fledged planet fit to be a multi-purpose human home and for an unknown period of time to come until God decides its continued existence has no longer any purpose. Thus, the two verses together seek to convey God's central message to the human species that it is He Who has created them for which they should be grateful and for which He expects in return nothing less than their quality worship and service to Him, and that He has chosen the Earth as their secure, comfortable and beautiful planetary home. The verse about the Earth just quoted also emphasizes God's stern reminder to His human creatures not to set up His rivals when they know too well that any rival to God they can think of could never satisfactorily explain why the Earth is as we know it.

To set up rivals to God as the ultimate cause of the origin of the Earth and as its architect, builder and sustainer is to commit polytheism (*shirk*), which the religion of Islam views as man's greatest sin. *Shirk* is the opposite of *tawhid*, which affirms the absolute unity of God's Attributes and Qualities. Through the Divine Acts of creation of human beings and making the Earth as a couch for them, sending down rain from the sky and bringing forth therewith sustenance for humankind, the two verses seek to project and instill into the human mind consciousness of primarily the Divine Attributes and Qualities of the Guardian-Lord, the Creator (*Al-Khaliq*), the Compassionate (*Al-Rahman*), the Life-Giver (*Al-Hayy*), the Sustainer and Nourisher (*Al-Razzaq*), the Wise (*Al-Hakim*), the Omniscient (*Al-'Alim*), the Powerful (*Al-Qadir*) and the Beautiful (*Al-Jamil*).

There are other Divine Attributes and Qualities that participate in the making of the Earth, but these named Qualities are the ones that feature the most prominently in the making of the Earth as man's planetary home. The great artistry and beauty of the work clearly demonstrates the uniqueness of its Maker and the unity of His Attributes and Qualities. It is because the making of the planet Earth, man's own home, provides so clear a proof of the principle of *tawhid* at work in the natural world that humankind is commanded not to set up rivals to God.

Third, the above verse about the Earth describes features that at once exhibit its uniqueness among the planets and the uniqueness of its architect, builder and owner. On the basis of this verse, the planet Earth is depicted as being blessed with ideal functional and aesthetic qualities that would best serve humankind. In functional terms, in conformity with normal architectural language and the appearance of things as seen from man's position on the Earth, the planet is described as a couch (*firash*) and the sky a canopy (*bina'*). The verse is obviously depicting the planet Earth as man's home, since couch and canopy refer to the most essential parts of a human home.

In actual fact, the appreciation of *firash* and *bina'* as home features, be these transient in the case of nomadic Bedouin homes or permanent as in the case of urban settlement homes, is found to be greater among the Arab desert dwellers, who happened to be the first recipients of the Quranic revelations. The Quran's analogy of the Earth as *firash* and the sky as *bina'*, expressed in a beautifully poetical way, must have deeply stirred their already active imagination, traditionally known for their

poetical bent, to the point of profoundly influencing their attitudes to the new revelations.

The Arabic word *firash* translated here as "couch" conveys the primary meaning of "a thing that is spread on the ground." From the point of view of its utility or function, *firash* refers to anything "that is spread on the ground for one to sit or lie upon," particularly "a bed upon which one sleeps."[23] In his exegesis of the Quran, Ibn 'Abbas was guided by this primary meaning when he interpreted the word *firash* in the verse now under discussion to mean "a place for dwelling and sleeping."[24] Classical lexicons cited other exegetes of the Quran as having similar interpretation of the word *firash*.[25] However, this primary meaning of the word is broad enough to admit new items to the list of home furniture that serves the same general purpose of seating and bedding. Thus, the word has been used to convey meanings that would refer to things we normally associate with a fully-furnished bedroom and living room such as bed, mattress, pillow, blanket, cushion and carpet. The word *firash* therefore refers essentially to what we would call "a comfortable human home."

The important thing to be considered here is how to understand the full meanings of *firash* when this word is applied to the whole Earth, which is a larger home on a planetary scale with the whole human species as its occupants, thus constituting a single human family. Analogously, to describe the Earth as a *firash* means that it is to be viewed as a comfortable home for the human family even though this "planetary household" is growing in size at a rapid rate. The interpretation of Ibn

'Abbas that the Earth as a *firash* means that it is "a place for dwelling and sleeping" for all human beings is not contrary to science. In describing the Earth as a couch, the Quran seeks to impress on all human beings that God has made it a luxurious and comfortable home for them.

Furthermore, the home is built with a multi-layered canopy-like roof that is functionally multi-dimensional in nature, especially to protect its occupants from physical dangers from outer space, including the sun, and also to help generate and regulate favourable climatic conditions inside and surrounding it. Interestingly, the traditional Arabic usage of the word *sama'*, including that in the Quran, is such that it can either mean a single sky or a plurality of skies one over another. For example, the Quran speaks of the whole firmament in the universe in the singular but as comprising seven heavens, including the physical one.[26]It also speaks of the lowest heaven (*al-sama' al-dunya*)[27] in the singular and yet it is itself multi-layered, both in nature and function, one of which is the rain producing sky.[28] The Earth's atmosphere comprising the first seven layers of the sky – troposphere, stratosphere, ozonosphere, mesosphere, thermosphere, ionosphere and exosphere – is part of the Quran's lowest heaven, or what classical Muslim astronomers and cosmologists called the sublunary region. The Quran and modern science find agreement on the idea of the protective and life-sustaining roles of the atmosphere for living things on Earth. The Quran describes rain originating from the atmospheric region as a source of sustenance, particularly for human beings, and accordingly as the best symbol of the atmosphere's life-sustaining role.

Three decades ago, following the discovery of a hole in the ozone layer of the atmosphere, mankind were being warned of the physical dangers that could come to them from this damage to its natural protective system. Scientists explained that the hole was due to ozone depletion resulting from excessive production of carbon monoxide caused by human activities on Earth. One known danger to human beings was that they would be exposed to leakage of ultra-violet radiation from the sun, which is harmful to them as it has been linked among other things to skin cancer, genetic damage and immune system suppression in living organisms. In its normal condition the stratospheric ozone layer would absorb this particular solar radiation. In architectural terms, as used in the Quran, the stratosphere and the ozonosphere may be viewed as two adjacent roof layers of man's planetary home, which God has constructed as part of its safety features.

Another important feature of man's planetary home is its abundant supply of water. The Quran seeks to impress upon man this planetary fact. Not only does it make frequent references to the rain supply but it also seems to be alluding to nature's "water cycle" when it says: "And We send down water from the sky in due measure (*bi-qadar*) and We lodge it in the ground; and We certainly are able to drain it off."[29] This verse is about the celestial production of water, its supply to the planetary home for distribution to its human occupants and other living species, and its retention in its pure and clean form in various forms of underground storage for human consumption. In using the phrase "in due measure" the verse also seems to suggest that the whole "water cycle" in question – comprising the processes of production, supply and distribution, underground storage, and drainage off the Earth – is subject to

some quantitative laws which mankind should not transgress. If through waste and over-consumption of water and various forms of environmental destruction man were to severely disrupt the water cycle, then the draining of water off the Earth as warned by the Quran could happen, leading to a water crisis for the planetary home. Early symptoms of this can actually be observed right now.

The foregoing discussion is primarily meant to highlight some of the unique features of man's planetary home. The Quran's treatment of this theme is far more extensive. However, our discussion in this article is more than sufficient to impress on the idea that God created the Earth as our planetary home that is completely safe, secure and comfortable for habitation, and also very beautiful. This planetary home provides the whole human family with more than what they really need throughout their stay. God guaranteed the sufficiency of man's means of livelihood on the Earth in these terms: "He set mountains on the Earth standing firm, high above it. And He bestowed blessings on the Earth, and measured therein all things to give them nourishment in due proportion…."[30]

Notwithstanding its safety, security, comfort and beauty, this planetary home is only meant to be a temporary one. The most explicit reference to the Earth as man's temporary home occurs in the second chapter of the Quran. The verse in view refers to God's command to the first human couple, Adam and Eve, and Iblis (Satan) to settle down on the planet Earth. He told them in these words: "Go down (all of you) with enmity between yourselves. On Earth will be your dwelling place (*mustaqarr*) and your means of livelihood for a time."[31] The gist of this

Quranic message to man is that the planet Earth is his "temporary (*ilahin*) home."

Safeguarding and Taking Care of Our Planetary Home: The Nature of the Human Responsibility

In the context of our present time – the age of inter-planetary travel and also the age of environmental destruction – it is extremely important to highlight the place and role of the planet Earth as man's unique and temporary home as discussed in the Quran, particularly in light of its present ecological and environmental conditions. This highlight is important because not just a few parts of our planetary home have been damaged. The damage is widespread and severe. More alarmingly, the structural foundation and many strategic parts of the home have been damaged as a result of the wrongdoings and irresponsible acts of many of its occupants. Likewise, many of the original key facilities provided to the home such as its water and power supply have all been wastefully used or over-utilized so as to impair their normal conditions and functions. In the name of economic development and material progress and affluence, so severe has the damage been to all these indispensable natural infrastructures to human life that it now threatens the security of the home and the life of all its occupants. Paradoxically, it is modern man who regards the planet Earth as his permanent home that has taken the least care to protect it from damage and destruction, rather than the traditional man who views it as only a temporary home.

The current global warming is a good indicator of the deteriorating state of the ecological health of man's planetary home. But it is

also a good reflection of the contemporary human condition and man's cultural ecological health. The former ecological health is a consequence of the latter. In addressing the contemporary ecological crisis of which global warming is one aspect, Islam seeks to remind man of his cosmic position as God's vicegerent (*khalifah*) on Earth. It is by virtue of this position that he is called upon to be a trustee and a guardian of his temporary home and to take good care of it. From the Islamic perspective, for man to play the role of *khalifah* on Earth individually and collectively he needs to be guided by two things, namely the Quran and the Prophetic Sunnah. However, to particularly address the issue of the current ecological crisis no content of the two sources of Islamic teaching is perhaps more pertinent than the guidelines for living according to the principle of *wasatiyah* ("balance and moderation") and avoiding transgression against limits that are providentially imposed both on the human world and the natural world. It is basically man's transgression against both kinds of limits that has brought about the current ecological crisis. An integral ecological education is certainly needed in our contemporary society. We believe the perspectives of the Quran of the Earth as man's unique and temporary home should be an important part of such an education.

References

[1] This article is an expanded version of a paper the author has presented at the International Conference on "Ethics, Climate Change and Energy" held at College of Religious Studies, Mahidol University, Thailand on 27-28 November 2014.

[2] See Seyyed Hossein Nasr, *The Encounter of Man and Nature: The Spiritual Crisis of Modern Man* (London: Allen & Unwin 1968). The book has undergone numerous editions and reprints as well as translations into many languages in all continents testifying to its universal appeal and global influence. In all subsequent editions the book's main title has been shortened to *Man and Nature*.

[3] Pope Francis, *Encyclical Letter Laudato Si' of the Holy Father Francis: On Care for Our Common Home* (The Vatican Press, 2015); hereafter this work will be cited as *On Care for Our Common Home*.

[4] Nasr is known to have an intellectual influence on the Vatican. *Man and Nature*, which was translated into Italian in 1976 was one of Nasr's books that influenced the Vatican thinking on the subject of the spiritual roots of environmental problems. In this encyclical Pope Francis referred to the Vatican position on the environmental and ecological crisis that has been progressively built up through the works of his Papal predecessors. Nasr's *Man and Nature* could not but have caught the attention of the Vatican's theologians and intellectuals given its content that includes a critical treatment of the historical and intellectual causes of the modern environmental crisis that are rooted in the Western Christian civilization (pp. 53 – 75). Nasr was also invited to the Vatican on various occasions. In November 2008 he was the main Muslim speaker, opposite the Pope, at the first Catholic-Muslim forum held at the Vatican on the theme of what is popularly known as "A Common Word" in reference to the commonalities between Christianity and Islam.

[5] The Quran is silent on the issue of the physical center of the universe. It identifies neither the earth nor the sun as the physical center of the universe. None of its verses is found to contradict the heliocentric theory. Moreover, the theory which places the sun at the center of our visible universe was not unknown in Islamic science. The tenth-century scientist, Abu Raihan al-Biruni, and members of the philosophical-scientific society, the Brothers of Purity (*Ikhwan al-Safa'*) are known to have expressed in their respective writings their awareness of the heliocentric theory. However, in many of its verses the Qur'an presents Earth-centric pictures of the universe, meaning its pictures from the point of view of the planet Earth and man who inhabits it.

[6] To describe Copernicus' heliocentric theory as a "scientific revolution" would be a misnomer. According to George Saliba, a noted contemporary Arab-American historian of Islamic science, the post-Copernican Western debate on the heliocentric theory was passionate, because it was essentially religious-philosophical in nature and not scientific. In contrast, the Muslim reactions were generally cautious and mainly confined to the scientific and mathematical issues related to the theory. Eighteenth-century Ottoman scientists considered Copernicus' theory as lacking in novelty in its mathematical aspects. They considered the pre-Copernican Muslim mathematical astronomy as far more sophisticated and superior. If the mathematical and scientific justification of the theory had been discussed in the light of the pre-Copernican mathematical models of the planetary system developed by Muslim astronomers in Maraghah in today's Azerbaijan and in Damascus several centuries earlier, then in Saliba's words, "a lot of the novelty of his [i.e. Copernicus'] astronomy would fade away." See George Saliba, 'Copernican astronomy in the Arab East: theories of the earth's motion in the nineteenth century,' EkmeleddinIh-sanoglu, ed., *Transfer of Modern Science and Technology to the Muslim World* (Istanbul: The Research Center for Islamic History, Art and Culture, 1992), p. 147.

[7] Pope Francis uses the phrase "Our Common Home" in referring to the planet earth. While the phrase is meaningful in emphasizing our common sense of belonging and our common destiny as members of the human species it does not preclude the idea of the possibility of other planetary homes for man besides the earth. Our own position on this issue is different. Our understanding of the Quran, which may not be shared by many other Muslims, is that the earth on which we human beings now live is our only planetary home, notwithstanding our own awareness that both the Quran and science affirm the existence of other earths.

[8] A sacred hadith differs from the other hadiths (Prophetic sayings) in that its meaning is from God but as to its wording it is from the Prophet Muhammad while in the latter both meanings and wordings are from him.

[9] According to a prophetic hadith, the first thing created by God was intelligence or intellect (*'aql*), which .serves as the source of all forms and degrees of intelligence distributed among all creatures.

[10] *The Quran,* 76:1

[11] *The Quran,* 51:56

[12] *The Quran,* 2:31.

[13] *The Quran,* 2:30

[14] *The Quran,* 2:32: "Glory to You, (O Lord!), of knowledge we have none, save what You have taught us," said the angels.

[15] *The Quran,* 17:70

[16] *The Quran,* 17:66

[17] See *The Quran,* 36:41: "And a sign for them is that We bore their descendants (through the Flood) in the loaded Ark."

[18] *The Quran,* 2:22.

[19] *The Quran,* 2:21.

[20] *The Quran,* 51:56

[21] *The Quran,* 36:61. See also chapter 1:5-7.

[22] On Islamic environmental and ecological wisdom see Osman Bakar, *Environmental Wisdom for the Planet Earth: the Islamic Heritage* (Kuala Lumpur: University of Malaya Press, 2007).

[23] E. W. Lane, *Arabic-English Lexicon*, vol. 2, p. 2371.

[24] *Tafsiribn 'Abbas*, p.

[25] E. W. Lane, *Arabic-English Lexicon*, vol. 2, p. 2371.

[26] *The Quran,* 2:29

[27] *The Quran,* 37:6-7

[28] *The Quran,* 2:19

[29] *The Quran,* 23:18

[30] *The Quran,* 41:10

[31] *The Quran,* 2:36

Christianity and the Ecological Crisis

Arnold T. Monera

Introduction

Supported by overwhelming scientific evidence, it is no longer alarmist that the unprecedented ecological crisis the world is facing today is a "profound moral crisis."[1] Our daily newspapers are filled with stories about greenhouse gases, melting ice caps and glaciers, deforestation, rising seas, drought and mega-storms, as well as pollution from industrial, transportation and consumer activities, and unlimited consumption. But, as Michael Northcott already noted in 1996, "[t]he single most pervasive and most potentially cataclysmic factor in the ecological crisis is that of climate change."[2] Climate change, also termed as "anthropogenic global warming," has been recognized by governments around the world as posing a very significant contemporary challenge because the increases in the global temperature are largely attributable to human activity.[3] There is an increasing recognition that "human societies are having a destructive impact on the ecological balance of God's creation through the polluting emissions from industrial, transportation and consumer activities."[4] Without concerted global efforts to address its fundamental causes, the ecological degradation's wide-ranging impact will continue to grow in intensity, and this could bring humanity to greater disasters and suffering. It will be the millions of the world's poorest people who will experience the worst impact from global warming. Hence, the environment has emerged as a fundamental issue for international political and public concern. The severity

of the issue has inspired debates and reflections not only by politicians and scientists, but also by religionists and ethicists.

Ecological Crisis: A Moral and Religious Issue

We might ask: Is not the ecological crisis basically a technological crisis? Because ecological problems are physical, economic and social, do they not require sophisticated scientific solutions? What has ecology to do with religious faiths? These questions bespeak of our society's "common sense" tendency to separate the material from the spiritual into two distinct realms of experience.[5] The engagement of different religions in addressing the spiritual and ethical dimensions of climate change from their respective sacred texts and traditions demonstrates the fact that "climate change is more than a scientific, ecological, economic and political concern, but has important spiritual and ethical dimensions as well."[6] Religions can no longer be simply dismissed as irrelevant in environmental discussions. The Iranian-American philosopher Seyyed Hossein Nasr explains, "The environmental crisis is fundamentally a crisis of values," and that religions, being a primary source of values in any culture, are thus implicated in the decisions humans make regarding the environment.[7] In a similar vein, "Religion in general," says David Horrell, "is arguably of key significance in shaping people's worldview, their understanding of the way things are, their place in the world, and their relationship to that which is around them."[8] Truly, religious worldviews are of profound importance in shaping human actions. Lynn White has rightly said that more science cannot respond completely to the ecologic crisis. "What people do about their ecology depends on what they think about themselves

in relation to things around them. Human ecology is deeply conditioned by beliefs about our nature and destiny – that is, by religion."[9]

Today more than ever, world religions are "being asked to reach into their rich traditions and values for ways to conserve the earth."[10] Tucker and Grim contend: "Religions, as ancient shapers of culture, can make invaluable contributions to rethinking our current impasse. Religions have developed ethics for homicide, suicide and genocide; now their challenge is to encompass biocide and ecocide."[11] There is exigency for religions to formulate new environmental ethics that would guide human behavior, a new understanding of the intrinsic relationship between humans and the rest of Creation. And the best way to achieve that is to be in dialogue with other disciplines (e.g., science, economics, public policy, education). The late Fr. Thomas Berry, one of the key figures that have shaped the Catholic ecology movement, has emphasized that what is necessary is a reevaluation of human-Earth relations – one characterized more by harmony than by domination. But in order to correct the distortion in our relationship with nature, we have to critically reconstruct our image of ourselves. It can be said that the environmental crisis is also a spiritual crisis. Many religions have traditionally been concerned with paths of personal salvation that often emphasize otherworldly goals and reject this world as corrupting and passing. Now we see an awakening and lively engagement from different faith and religious traditions as they join hands together for a common future armed with the realization that "the climate crisis is about the survival of humanity on planet earth, and action must reflect these facts with urgency."[12] With the global reach of religions

and their social, cultural and political influence in many parts of the world, the message that care for the Earth is a fundamental element of faith will surely have a tremendous potential significance for the future of the environment.

Christian Response to the Ecological Crisis

It is widely recognized that the awakening of the Christian Churches toward the conservation of our environment is relatively recent.[13] The *vaticanista* John Allen, Jr. writes in his book *The Future Church* (2009) that it was fashionable among pioneers of the environmental movement in the 1960s and 1970s "to fault the entire Judeo-Christian tradition for humanity's savage indifference to the earth."[14] Critics of the Christian tradition charge that Christianity is a primary source of the ecological crisis. They blame the Christian tradition and its scriptures as "the seed of the rapacious attitude toward the natural environment."[15] Thus, they argue that in order to save the earth from further destruction the Christian anthropocentric tradition espoused by the Bible must be discarded. Some critics even proposed the need to go back to the ancient and indigenous religions where nature was reverenced.

Back in 1843, the philosopher and anthropologist Ludwig Feuerbach maintained, "Nature, the world, has no value, no interest for Christians. The Christian thinks only of himself and the salvation of his soul."[16] Feuerbach "was not the first to accuse Christianity of excessive anthropocentrism, and he was certainly not the last."[17] The foremost example of this accusation came from Lynn White (a medieval historian at the University of California and a lay Presbyterian himself), who chastised

Christianity for crimes committed against nature. In his lecture at the meeting of the American Association for the Advancement of Science in 1966, which was later published in *Science* magazine entitled "The Historical Roots of our Ecologic Crisis" (1967), White blamed (Western) Christianity and its biblical creation account for making Westerners feel "superior to nature, contemptuous of it, willing to use it for our slightest whim."[18] He claimed that modern science and technology are products of Western culture, and because Western culture has Christian attitudes and principles as its roots, and because Western Christianity is "the most anthropocentric religion the world has ever seen,"[19] Christianity has become arrogant toward nature and "bears a huge burden of guilt."[20] The biblical claim that human beings alone are created in the image of God, set apart from nature and commanded by God to have "dominion" over creation (Gen 1:26-28), has shaped the typically Western "instrumentalist" view of nature: that the natural world exists solely to meet human needs. Lynn concludes, "Hence we shall continue to have a worsening ecologic crisis until we reject the Christian axiom that nature has no reason for existence save to serve man."[21] White, however, considered St. Francis of Assisi as "the greatest spiritual revolutionary in Western history" for offering an alternative view of humans' relationship with nature. He further proposed Francis to be made the patron saint for ecologists. Thirteen years later, on April 6, 1980, Pope John Paul II officially proclaimed St. Francis as such. White's simplistic and one-sided reading of biblical teaching and Christian tradition may have provoked a flurry of reactions, but it is "considered the classic indictment of the Christian tradition's attitude toward nature."[22] In fact, it has become the obligatory point of departure for every discussion of Christianity

and the environment.[23] White's challenge to Christian theology cannot be brushed aside. Most books on Green theology and many biblical contributions to ecological theology have been "deliberately aimed at defending Christianity against the accusations of Lynn White."[24] The lesson learnt is an urgent need for Christian theology to engage in serious self-criticism and for Christians to accept honestly their complicity in the abuse of the environment. Is the Christian theological tradition unfriendly to the natural environment? In contrast to White's claim that the Bible advocates a despotic role for humans vis-à-vis the natural world, scholars claim that the Bible more accurately promotes a stewardship model – "a responsible, caring and sustaining role, not one of exploitation or thoughtless mismanagement."[25] Or better perhaps, the model that sees humans as fellow-members of God's community of creation – all earthly creatures sharing the same Earth and all participating "in an interrelated and interdependent community, orientated above all to God our common Creator."[26]

Besides faulting biblical creation as legitimizing humans' aggressive domination of the earth, the other side of the pendulum reproaches biblical eschatology (i.e., view of the "end-times") as having an impact on Christian attitudes towards the environment. There are biblical texts that suggest the imminent return of Jesus, which would be accompanied by cosmic catastrophes preceding the final day of salvation, heralding the arrival of the new heaven and earth (e.g., Mark 13; 2 Peter 3:10-13). Thus, working to preserve the natural environment is deemed pointless since, according to God's purposes, the destruction of the physical cosmos happens before the "end-times." These "eschatological views, explicitly or implicitly,

foster a view of the earth as merely temporary and soon-to-be destroyed home for humans, from which the elect will be rescued."[27] If "heaven and earth will pass away," why then bother about environmental preservation? As environmentalist David Orr indicates, "belief in the imminence of the end times tends to make evangelicals careless stewards of our forests, soils, wildlife, air, water, seas and climate."[28] These conservative evangelical Christians argue that global warming is of little importance compared to how one is "going to live [in either heaven or hell for] eternity."[29] They are openly skeptical about the reality of any ecologic crisis. They suspect any move towards environmental stewardship or ecological awareness as emanating from evolutionary and New Age worldviews.[30] A Baptist church in Boise, Idaho, printed and distributed this bumper sticker: "Forget 'Save the Earth'; What about your soul? The earth is going to burn, what about you?"[31] James Watt, a professing evangelical, who became U.S. Secretary of the Interior under Ronald Reagan in the early 80s, viewed the earth as "merely a temporary way station on the road to eternal life … The earth was put here by the Lord for His people to subdue and to use for profitable purposes on their way to the hereafter."[32] Fundamentalist Christians who are opposed to environmentalism and who usually appeal to biblical texts like 2 Peter 3:10-13 never see global warming as the real threat, but the fire of judgment which God will bring upon the earth. To cite an example:

> Global warming is coming, but not the Al Gore type. II Peter 3:10-13 states … Jesus died to save our souls, not to save the earth submitted to a United Nations Earth Charter. We should be preparing for God's global

> warming program, the day of judgment, not Al Gore's unscientific diatribe of distortions and lies.[33]

These examples show the varying views existing among different Christians and denominations as to the proper relationship between Christianity and the environment. Is it possible for a Christian to be so committed to the supreme authority of the Bible and also committed to the environmental cause? "Commitment to both," according to Horrell, "*requires* a reading which shows that the Bible is ecofriendly."[34] Is the Judeo-Christian Bible "Green"?

The 'Greening' of Christianity

Christianity is ranked the largest religion in the world today. According to PEW Research Center's Forum on Religion & Public Life, in 2010 there were 2.18 billion Christians around the world, nearly a third (31%) of all 6.9 billion people on Earth. The Center for the Study of Global Christianity (2011) at Gordon-Conwell Theological Seminary reports that there are approximately 41,000 Christian denominations and organizations in the world. The Roman Catholic Church is the largest Christian group with an estimated 1.2 billion followers, constituting about half of the world's Christian population. As of today, more than 40% of the world's Catholics live in Latin America. There are approximately 800 million Protestants in the world. The Orthodox Christians are approximately 260 million people worldwide. One can just imagine the impact Christianity can have on the world if its adherents properly "recognize a relationship between their faith and the future of the planet."[35]

The Catholics and Ecology

Has the Catholic Church done much to proclaim the message of the integrity of creation? Prof. Brennan Hill recognizes that "[a]mong the Christian churches, the Catholic Church has been slow to address environmental issues."[36] The Catholic Church, adds Hill, "remained quite aloof from the debate that swirled around White's charges and gave little attention to environmental issues."[37] While the Second Vatican Council (1962-65) was concerned about Church reform, it did not deal with ecology. Jesuit Fr. Thomas Massaro, writing in 2000, laments the fact that:

> Although care for the earth is a theme that fits easily with the call to social responsibility within Catholic social teaching, it is surprising how seldom ecological concerns are actually mentioned in the encyclicals. There are practically no sections of the social teaching documents that offer an extended treatment of what it means to practice 'environmental justice.'[38]

Fr. Massaro is not alone in this valuation. Marvin Krier Mich in his book *Catholic Social Teaching and Movements* (2001) admits that Catholic social teaching on the environment is "an area that has been largely ignored in the official documents."[39] Moreover, he adds, "leadership on environmental issues is often found in secular arenas as well as in non-Christian religions."[40] Irish Columban Fr. Seán McDonagh, in a talk titled "Mission and Ecology in the Catholic Church" he delivered at the World Council of Churches (Geneva) in September 2006, complains that Catholic 'mission' today has been understood as involving "a transformation of humanity, promotion of human rights,

respect for others, … Inter-Religious Dialogue and respect of culture," yet nothing is mentioned "about Mission in the context of the extraordinary levels of destruction of God's creation taking place on planet Earth."[41] According to McDonagh, "The human reality (often cut off from the rest of creation) is so central to the teaching office of the Catholic Church and many Catholic theologians that everything else gets side tracked."[42] Krier Mich observes that "[t]he tone of the Vatican II documents, especially *Gaudium et Spes,* was to praise the accomplishments of modern technology. The council fathers … were dazzled by the marvels and promise of modern science and technology in 'mastering' nature."[43] With a growing worldwide consensus that damage to the environment is reaching a critical point, the Catholic Church cannot remain silent. In short, the Catholic teaching on ecology and global warming, either from the Papal Magisterium or Bishops Conferences, according to Fr. McDonagh, "is pretty meager."[44] But things are slowly changing.

The first substantial papal statement on environmental concerns and where there is a reference for the first time to global warming in Papal teaching came from Pope John Paul II's 1990 World Day of Peace Message titled "The Ecological Crisis: A Common Responsibility," in which he confirmed that "Christians, in particular, realize that their responsibility within creation and their duty towards nature and the Creator are an essential part of their faith" (no. 15).[45] Responsibility towards creation is not something optional, but a fundamental aspect of what it means to be a Christian. In 2001, the same pontiff "located the birthplace of the ecological crisis in the moment when human beings stopped regarding themselves as servants of a Creator-God, and instead set themselves up as 'autonomous despots'."[46] On

the national and local levels, bishops' conferences throughout the world have begun addressing the environmental issues: Dominican Republic (1987), Guatemala (1988), Northern Italy (1988), Philippines (1988), Australia (1990), and the United States (1991), to mention a few.[47] As of 1996, there were 48 statements on ecology issued by bishops' conferences around the world. These official statements reflect the varied environmental problems unique to particular areas and how the Church is responding to them.

The Catholic Church has indeed gradually awakened to the urgency of the environmental crisis. As the Papal Nuncio to the United Nations affirmed, "In more recent times, the leadership of the Catholic Church has publicly and forcefully expressed concern about the damage to nature being caused by a privileged few, while the health and overall well-being of the vast majority of humans is being threatened through no fault of their own."[48] Pope Benedict XVI during his papacy expressed such grave concern on this issue that he was popularly labeled as the "green Pope". Woodeene Koenig-Bricker has collected statements about ecology by Benedict XVI into a small book entitled *Ten Commandments for the Environment* (2009). Many keen observers believe that Pope Francis has taken the environmental protection as a landmark of his papacy when he took the name of the patron saint of ecology, Francis of Assisi. When the President of Ecuador Rafael Correa met Pope Francis at the Vatican on April 22, 2013, the Pope remarked, "Take good care of creation. St. Francis wanted that. People occasionally forgive, but nature never does. If we don't care for the environment, there's no way of getting around it."[49] During the Pope's Wednesday Audience at the Vatican on May 21, 2014,

Francis told the crowd: "Safeguard creation, because if we destroy creation, in the end it will destroy us! Never forget this!"[50] More recently the Holy See hosted a major conference on climate change at the Vatican with the theme "Protect the Earth, Dignify Humanity: The Moral Dimensions of Climate Change and Sustainable Humanity" with no less than U.N. Secretary-General Ban Ki-moon giving the opening address. Participating were representatives from major religions and leading scientists and specialists on climate change (April 28, 2015). The participants of this forum declared that human-induced climate change is a scientific reality. They acknowledged the "very vital role" played by religions through their affirmation of "the inherent dignity of every individual linked to the common good of all humanity" as well as "the beauty, wonder and inherent goodness of the natural world." This was clearly another sign of Pope Francis' "green agenda." Sometime in June or July of this year (2015), Pope Francis was to release an encyclical devoted to the ethical aspects of environmental issues.[51] The eagerly awaited encyclical would elevate the moral and religious/spiritual dimensions of the ecological issue and "can reach the world's 1.2 billion Roman Catholics with an unmatched power to convince and motivate."[52] Ban Ki-moon remarked in his address: "I very much look forward to the upcoming encyclical by Pope Francis. It will convey to the world that protecting our environment is an urgent moral imperative and a sacred duty for all people of faith and people of conscience. It is critically important that people and their leaders hear your strong moral voice in the coming months."[53] Truly, "the pope … can reach segments that the three primary messengers on climate change – environmentalists, Democratic politicians and scientists – cannot."[54] Already

now conservative Catholics in the United States are objecting to the Pope's move by claiming that climate change is being overhyped. They are warning the Pope not to take sides in the debate. According to these critics and skeptics, the Pontiff "should not be weighing in on issues that touch on technical and scientific matters that some contend are still debatable."[55] Pope Francis does not appear perturbed by what these critics are saying. According to Cardinal Peter Turkson, the President of the Pontifical Council for Justice and Peace and the one leading the drafting of the pontiff's encyclical on the environment, there are four principles of integral ecology that are reflected in the ministry and teaching of Pope Francis[56] :

(1) The call to all people to be protectors is integral and all-embracing. We are all called to protect and care for both creation and the human person. These are reciprocal concepts. For the natural environment to be respected, the human environment and its objective moral structure must also be respected.

(2) Care for creation is a virtue in its own right. For the Christian, to care for God's ongoing work of creation is a duty. It is wrong and a distraction to contrast "green" and "Christian." "A Christian who doesn't safeguard creation, who doesn't make it flourish, is a Christian who isn't concerned with God's work, that work born of God's love for us."[57] Being a protector of creation, of the poor, of the dignity of every human person is a *sine qua non* of being a Christian, of being fully human.

(3) We must care for what we cherish and revere. Binding regulations, policies, and targets are necessary tools

for addressing poverty and climate change, but they are unlikely to prove effective without moral conversion and a change of heart. St. Francis of Assisi is an example par excellence of a lived and integral ecology. His love for creation, for creatures and for the poor are one; they form an integral whole. Like St. Francis, our response to the wonder of creation must be reverence – a deep and relational aspect based on kinship and fraternity, the kinship with God, our neighbor and the land spoken of in the Scriptures.

(4) Integral ecology, as the basis for justice and development in the world, requires a new global solidarity. The rich could learn much from the poor about solidarity, especially that human-induced climate change is caused primarily by the wealthy of the world with their excessive energy usage. During the World Youth Day in Brazil (2013), Pope Francis noted:

> I would like to make an appeal to those in possession of greater resources, to public authorities and to all people of good will who are working for social justice: never tire of working for a more just world, marked by greater solidarity … The culture of selfishness and individualism that often prevails in our society is not what builds up and leads to a more habitable world: it is the culture of solidarity that does so, seeing others not as rivals or statistics, but brothers and sisters.

For Pope Francis, the threats that arise from global inequality and the destruction of the environment are inter-related. They are the greatest threats the human family is facing today. What is, therefore, needed is an integral approach to ecology, not

one limited to scientific, economic or technical solutions. Come September 2015 Pope Francis, the first pontiff from the Americas, will address the U.N. Summit on Sustainable Development.

The Orthodox Church and Ecology

The Argentinian Pope finds an ally in the Archbishop of Constantinople and Ecumenical Patriarch Bartholomew I, the so-called 'Green Patriarch' of the Greek Orthodox Church. On November 8, 1997 at Santa Barbara Greek Orthodox Church in California, Patriarch Batholomew remarked, "To commit a crime against the natural world is a sin."[58] An Orthodox Christian worldview is essentially an ecological worldview. Its perspective on the natural environment, according to the Patriarch, "derives from the fundamental belief that the world was created by a loving God … so the entire world contains seeds and traces of the living God."[59] The earth and all matter it contains are inherently good, but matter can be used by humans in a way that dishonors God or goes against nature. The whole cosmos, from the Orthodox Church's perspective, is a communion. The writings of the Church Fathers contain numerous statements reflecting on the harmony and interconnected of the universe.[60] Thus, a proper understanding of the environment must include knowledge of our role in this cosmos. John Chryssavgis' edited book titled *Cosmic Grace, Humble Prayer: The Ecological Vision of the Green Patriarch Bartholomew I* (2003) includes encyclical letters, addresses, statements, writings, interviews and other comments that the Patriarch has made regarding the connection between ecological and religious issues.

The WCC and Ecology

The World Council of Churches (WCC) made up of Protestant, Orthodox and Anglican Churches in more than 110 countries, and representing over 500 million Christians, has a long history of work on climate change. Cardinal Roger Etchegaray, the then President of the Pontifical Council for Justice and Peace, acknowledged in his 1996 letter to the Presidents of the Episcopal Conferences of industrial countries that the WCC has taken a leading role in drawing the attention of its member Churches to the relationship between climate change and human activity.[61] The WCC sees climate change as a profoundly ethical and spiritual issue. Moreover, the WCC asserts that it is human-induced and therefore committed to challenging the forces that are causing human-induced climate change. Dr. David Hallman describes the WCC's involvement with climate change in this way:

> The ecumenical work on climate change has encompassed ethical and theological reflection, resource development and distribution, advocacy at the international and national levels, and solidarity and accompaniment with churches in areas already experiencing the impact of human-induced climate change.[62]

The WCC has gone way ahead of the Catholics in developing an extensive body of teaching on global warming. It is worth mentioning that even the phrase "integrity of creation" originated from the WCC. In 1994 WCC published a document entitled *Sign of Peril, Test of Faith, Accelerated Climate Change*. Then in 2002, it came up with another excellent document

on climate change, *Solidarity with Victims of Climate Change*. Other materials on ecological concern include: *Spiritual Values for Earth Community* (2000), and *Ecotheology – Voices from South and North* (1994), *Resisting the Threats to Life: Covenanting for Justice Peace and the Integrity of Creation*(1989).

In their efforts to address the challenges of climate change, the WCC member Churches are connected in prayer each year during 'Time for Creation' have called for the "education of their own members, action in solidarity with victims of climate change and advocacy to press all countries, particularly those richer nations who contribute most per capita to the problem, to take aggressive steps to reduce their emissions."[63] They have vigorously pressed their governments to ratify and implement the Kyoto Protocol and have been present at all UN climate change conferences. The WCC has also initiated meetings of different faith and religious traditions on climate change. A worthwhile example is the Interfaith Summit on Climate Change hosted by the WCC and Religions for Peace held in New York on September 21, 2014, during which the participants stated:

> As people of faith, we call on all governments to express their commitment to limit global warming well below 2° Celsius. We emphasize that all States share the responsibility to formulate and implement Low Carbon Development Strategies leading to de-carbonization and the complete phase-out of fossil fuels by mid-century.[64]

We have seen thus far that all Christian Churches have a stake in the current environmental issue of climate change. Christians have a sacred responsibility to the earth and the creatures within

it. "When creation is threatened by climate change, Churches and the ecumenical movement at large are called to speak out and act as an expression of their commitment to life, justice and love."[65] From all fronts, various Christian groups are contributing their share in developing new ecological theologies and environmental ethics linked to areas of public policy. Many parishes and dioceses have adopted programs to raise awareness of the pollution problem and to organize efforts, like recycling, organic farming and raising funds, to preserve our fragile ecosystem.[66] Christian scholars are devoting themselves to a critical re-reading and rediscovery of the Bible with an ecological awareness.[67] The voluminous body of literature on "Christianity and Ecology" and "Bible and Ecology" that have come out in recent years are living attestations. Christian universities have established centers to bring the link between religion and climate change to national and international awareness. The Forum on Religion and Ecology spearheaded by Yale University professors Mary Evelyn Tucker and John Grim is a foremost example.[68] The Earth Bible Project led by Norman Habel is another example by which theology and biblical interpretation respond to environmental degradation. Public lectures and symposia are held to raise people's awareness. For instance, Catholic Theological Union in Chicago is presenting a series of public lectures on the Church and the Environment (titled "Care for Creation: Scripture, Science, and Ethics") from September 8 - December 1, 2015.

These are just a few examples of initiatives being spearheaded by Church people. Christians believe that the world is created by God and loved by God. Humans are part of God's wonderful

creation and therefore have a responsibility to care for the earth with a love that mirrors God's own love for it. As Pope Francis puts it: "A Christian who does not protect creation 'does not care about the work of God.'"[69]

The "Green Bible"

Because of its strong anthropocentric message, the Judeo-Christian Bible has often been reproached as one of the causes of the ecological malaise humankind is experiencing today. The environment-minded reader wants to know if there are passages in the Bible dealing with ecological issues, such as integrity of creation, eco-justice, stewardship, ecological lifestyle, etc. Is the God of the Bible "green"? Did Jesus have anything to say about the environment? Gordon Zerbe of the Canadian Mennonite University strongly believes that "[f]rom beginning to end, from first part to last part, the Bible is an ecological book."[70]

It has become fashionable in recent years for bible publishers to provide bible editions and commentaries with particular themes targeting specific audiences.[71] To address questions about the environment, HarperCollins published in 2008 *The Green Bible*. This English version based on the New Revised Standard Version has featured supplementary essays by N.T. Wright, Barbara Brown Taylor, Brian McLaren, Matthew Sleeth, Pope John Paul II, Archbishop Desmond Tutu, and Wendell Berry. In Richard Cizik's evaluation, "This is exactly what the Church needs at this critical time."[72] The intention of the Green Bible is "to equip and encourage [readers] to see God's vision for creation and help [them] engage in the work of healing and sustaining it."[73] How do the publishers achieve

this goal? The *Green Bible* prints in forest green ink verses and passages which, in the perception of the publishers, deal with environmental issues in order to draw the reader's attention. Of the total 31,101 verses in the Bible, 2,397 are printed in forest green, representing about 7.71% of the Bible text.[74] The "greenest" Old Testament Books are the minor prophets: Haggai (34.21%), Joel (32.88%) and Habakkuk (19.64%). In the New Testament, the "greenest" are 2 Peter (22.31%), Revelation (16.58%) and Colossians (15.79%). The green verses and passages are divided into four categories: (1) How God and Jesus are involved in creation; (2) How all elements (land, water, plants, humans, animals) are interdependent; (3) How nature responds to God; and (4) How we are called to care for creation. It is worthwhile noting that the bible itself is printed on recycled paper using a soy-based ink with a cotton/linen cover. Some other features of the *Green Bible* include a topical index for finding verses pertaining to specific subjects and commendable advices, like "Action Ideas" and "Practical Tips" in the concluding article "Where Do You Go From Here?"

The *Green Bible* hopes to target two environment-minded audiences: (1) committed environmentalists, or those attracted to environmentalism, who view Christianity with skepticism - people who might become open to Christianity if they see that God is green; (2) Christians who like to find biblical confirmations for their attraction to environmental issues.

Reactions to the *Green Bible* have been mixed. While The Sierra Club, The Humane Society, and the Eco-Justice Program have all officially endorsed the *Green Bible*,[75] some Christian leaders have raised issues with how the content is presented,

arguing that the environmental message has de-emphasized the Bible's central message of Gospel.[76] Commenting on the *Green Bible*, Richard Land, head of the Southern Baptist Convention's Ethics and Religious Liberty Commission, said: "Sure it's important, but when they asked Jesus what was most important, he said, 'Love your God, and love your neighbor as yourself.' He didn't say anything about creation."[77] Some conservative Christians still believe that the urgent agenda for the Christian community is not the reclamation of earth, but the reclamation of souls.

Whether one praises or rejects the *Green Bible*, the message that it aims to convey stands out crystal clear: God has called us to be responsible members of the community of creation. Thus, it is imperative for Christians to return to the biblical sources of our faith in order to rediscover that humans are fellow-creatures with other creatures. Furthermore, bible scholars remind us that there is a remarkable commonality between the ecological and biblical perspectives. Howard Snyder has identified a number of parallels between the two:

- Both ecology and the Bible view the world in a long-range time frame.
- Both ecology and the Bible see the natural world as one interconnected whole.
- Both ecology and the Bible focus on the significance of land.
- Both ecology and the Bible present us with an awareness of limit.
- Both ecology and the Bible see the natural order as subject of decay.
- Both ecology and the Bible show that all behavior has consequences.[78]

Perhaps the most comprehensive commonality between ecology and the New Testament is found in the notion of "Kingdom of God," a theme which has significant ecological implications. In the rule/reign of God everything is included. "Everything in the Kingdom of God is joined both to it and everything else that is in it."[79] For Zerbe, "the rule of God includes the notion of ecological balance (*shalom*) in all creation, particularly between humanity and the earth, its God-given home, its *oikos* (from which we derive the term 'ecology') and habitat (from the Latin *habitation*, 'dwelling')."[80] The Kingdom/reign of God entails the renewal of all creation, human and natural; it links the human and cosmic aspects of redemption; it means the ultimate unity of all things, including heaven and earth, so that God is all in all.[81]

Environmental Challenge to Christianity

By no means are we claiming that Christianity had always been an upright steward of the environment. In fact, as the theologian Daniel Migliore has rightly stated, there is sufficient reason for Christianity to repent for its participation in the abuse of the environment and for Christian theology to engage in serious self-criticism.[82] Certainly, the Christian is called to constantly engage in self-critical examination regarding one's place in the world and one's identity as creature among countless other creatures. Migliore identifies "some of the deep-seated attitudes and practices that underlie the ecological crisis, and to consider the searching questions they pose for Christian theology and the church."[83]

The first is *anthropocentrism*, a view of the world as existing primarily to serve the needs and desires of humankind. The environmental crisis we are experiencing today is not just a matter of population, consumption and industry but it is caused by a kind of attitude or worldview that people have. There is no denial that religions shape people's worldview, their place in the world, and their relationship to their surroundings.[84] Christianity, particularly Catholicism, has a strong tendency toward anthropocentrism.[85] Anthropocentrists regard nonhuman nature primarily as having only instrumental value for human flourishing. It views man as "the measure of all things" (Protagoras). It is a mistaken notion that the Judeo-Christian Bible is only concerned about human salvation and that the natural world was considered merely as some kind of a "backdrop" of this history of salvation. This is partly because in the past biblical scholars largely ignored the Bible's view of the natural world.[86] Salvation is for all of creation. The whole of creation is in need of redemption from human abuse. No wonder, then, that some theologians and biblicists have proposed a theocentric, relational ethics adequate for today's Churches to counter anthropocentrism and radical individualism.[87] "The Earth is the Lord's and all that is in it, the world, and those who live in it" (Psalm 24:1). The first article of the Apostles' Creed affirms the Christian's faith in God the creator, "Maker of heaven and earth." Thus, Dianne Bergant argues that the Bible is theocentric, not anthropocentric. If Christianity has to be truly "green," then it is fitting "to retrieve and draw out the implications of the radical theocentrism that is at the core of the biblical witness."[88]

The second is viewing *power as domination*. At the core of the ecological crisis is the misuse of power. Humans who are tasked by God to "have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the wild animals of the earth, and over every creeping thing that creeps upon the earth" (Genesis 1:26) thought they have unlimited power and license to exploit nature for their own use. As stewards of the earth, human beings do not own the natural world, but rather are benevolent caretakers on behalf of its rightful owner, who is God. Creation is not a property which humans can rule over at will. It is not even the property of only a few. As Pope Francis reminds us, "Creation is a gift, it is a wonderful gift that God has given us, so that we care for it and we use it for the benefit of all, always with great respect and gratitude."[89] Migliore admits that Christian theology has partly contributed to the view of power as domination in relation to the environment: "When God is viewed as overwhelming power and humanity is seen as the image of God summoned to exercise divinely given 'dominion' over the earth, theology becomes a potent contributor to the modern conquest of nature."[90] We have failed in our mission as stewards of the Earth when we characterize our relationship with the rest of creation as more of dominion than harmony; when we have not fought for responsible policies aimed at environmental protection at all levels; when we consume and possess too much, unmindful of the next generation. The Anglican Archbishop Rowan Williams observes that humans have now nearly lost the art of being creatures.[91] All creatures together, great and small, are "the work of God's hands" (Psalm 138:8). And God affirmed that creation was good in his sight. Thus, the idea that humans are free to destroy God's creation is at odds with God's palpable enjoyment of his creation as taught in Genesis.

The third is the *denial of the interconnectedness and interdependence* of all forms of life. This attitude flows from the first two. The ecological crisis is a loss of connectedness. Humans have broken their relationship with the Creator of heaven and earth. When humans are disconnected from God, the soil (*adamah*) will be the first to suffer. Land degradation (see Lev 26:18-20) is a sign that humans have turned away from God. On the contrary, the flourishing of the land (Lev 26:3-6) marks a return to God. Davis remarks that the whole created world is longing for *homo sapiens*, the creature who claims to be "wise," to become fully human. To be fully human is to be in proper relationship with the Creator – and with the rest of creation.[92] Douglas John Hall sees the human as "being-with" God, the neighbor and the nonhuman other. These are the three dimensions of relatedness, not three distinct relationships.[93] It seems many Christians have given prominence (rightly) to the first, acknowledged the second, but in large part ignored the last of these three. Humans are but one part of the environment. We must recognize our unbreakable bond with the land, the material base of life. Our life as a people comes from the land. Its destruction is concomitant with ours. Migliore states,

> Respect for other, nonhuman forms of life does not require that we attribute personhood to them. Rather, the question is whether other forms of life have a value in and of themselves, not entirely dependent on human purposes.[94]

Christian care for creation should take more seriously the intrinsic value of nonhuman created things. Our understanding of the concept of stewardship should include the fundamental human vocation to serve and keep God's creation.[95]

Conclusion

Based on trends in official declarations, political interventions and pastoral praxis from different Christian Churches, it becomes clear that Christianity has begun to recognize an organic connection between faith and ecological issues. Indications are clear that ecological concerns will occupy an increasingly important place in the different Christian Churches. Christians cannot be remiss of their prophetic ministry to protect the integrity of creation. As Christians, our ethical behavior can no longer be confined solely to our relationship with God and with our fellow human beings. It must necessarily extend to and include interconnectedness and interdependence with all creation. The world is one single organic reality; its life-forms mutually support one another. Our personal destinies and those of the entire cosmos are inseparable. Both nature and humans are waiting eagerly for the restoration of the original divine harmony and humans have an important role to play in this restoration. Perhaps Christianity can start listening to what tribal peoples and the other great religions of the East are saying about ecology. It is fitting to end with a quote from the wisdom of a chieftain of the Duwamish Indians when the U.S. government wanted to buy his tribe's land:

> If all the beasts were gone, we would die from a great loneliness of spirit, for whatever happens to the beast happens to us also. All things are connected. Whatever befalls the earth befalls the children of the Earth.[96]

In the same vein, Pope Benedict XVI wrote in his encyclical *Caritas in Veritate*, "The way humanity treats the environment influences the way it treats itself and vice versa."[97]

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Catholic Social Teaching and Environmental Responsibility: The Prospects in and for China's Development

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Introduction: After The Songhua River Disaster

A turning point in the development of Chinese sense of environmental responsibility seems to have arrived in the wake of the Songhua River disaster in 2005. After the failure of a business-as-usual cover-up intended to prevent social panic and disorder, China's leadership apparently realized that a new approach based on transparency and accountability was needed -- one that could build trust among its internal stakeholders as well as international neighbors, in order to assure the world that China was becoming a responsible partner in addressing shared concerns about the environment. Further progress since that time includes efforts to punish and/or eliminate polluters, promote the adoption of cleaner energy sources, reduce greenhouse gas emissions, and other measures.[1]

Such initiatives are commendable, and may be sufficient to respond to local disasters. But what of the looming global disaster of catastrophic climate change? China has committed itself[2] to agreements with the USA and other international actors in taking drastic steps to reduce carbon dioxide emissions and other pollutants believed to be contributing to global warming.

The goal at this time is to stabilize global warming at or below an increase of 2 degrees Celsius, which will still have serious negative impact globally, but will not be as catastrophic as a projected average annual temperature increase of 4 or more degrees Celsius that is projected to occur by the end of this century if nothing is done now. Meeting this 2 degrees mitigation target, however, will require a truly extraordinary effort involving all sectors of society, through an ongoing commitment to education for environmental responsibility capable of changing the lifestyles of people across this planet. While China's structure of governance may be able to make major changes quickly once the political and moral will for change emerges, it is clear that China like all other governments will need all the help it can get to convince people generally to take up the path toward a sustainable environment.

Among the neglected resources for popular education seeking to achieve a significant shift in peoples' priorities toward environmental responsibility are the major world religions, and notably the global reach of the Catholic Church and its tradition of Catholic Social Teaching (CST). This essay is an attempt to discern the moral and spiritual resources that CST can contribute to the education of all peoples, but especially the people of China and East Asia, on how to embrace the challenge of environmental responsibility in the face of the clear and present danger of catastrophic climate change. Since Catholicism has been a religion practiced by the Chinese people for over a millennium, and has been granted legal recognition by the Chinese Constitution of 1982[3] , its teachings on respect for nature and all living beings sustained by it, including Pope Francis' most recent interventions regarding catastrophic climate change,

should be seen as an important resource as the government and peoples of China move forward to embrace a strong commitment to environmental responsibility.

A Tipping Point In China?

On November 13, 2005, an explosion at the China National Petroleum Corporation (CNPC)'s Jilin branch contaminated the water of the Songhua River. This large-scale pollution affected millions of Chinese and Russians living along the riverbanks and cost local economies millions of *yuan*. In the aftermath of the explosion, local Chinese authorities initially denied that dangerous pollutants had been released. However, the carcinogenic nature of the spill became known and led to increased public anxiety as well as distrust of the local government. It was not until several weeks after the incident that the central government finally intervened in clean-up efforts, and began to implement long-term as well as short-term measures to protect the environment from future catastrophes. In retrospect the Songhua River[4] crisis may have marked a tipping point in China's efforts to enforce environmental legislation and promote environmental awareness in society as a whole.

When the violent explosion occurred at the CNPC's Jilin operations, it was the result of a fire sparked by improper handling of hazardous materials (Yong, 2005). The blasts led to the release of 100 tons of carcinogenic chemicals into the Songhua River as a toxic cloud hovered over Jilin City (Chen, 2009), which initially caused 5 deaths, 30 injuries and the evacuation of over 10,000 residents from the surrounding area (*China Daily*, 2005a). But on the day after, in order to dampen

the frenzy touched off by the evacuation, Wang Wei, deputy mayor of Jilin City, reassured the public that the explosion "did not produce large-scale pollution … Water [quality] has not changed" (Ansfield, 2005).

Despite these reassurances, or precisely because of them, CNPC managers and local officials including Wang tried to manage the pollution on their own. Without notifying officials in Beijing, they "drain[ed] reservoir water into the Songhua in an attempt to dilute the contaminants" (Green, 2009). Five days after the explosion, on November 18, the central government finally intervened, sending environmental experts to report on the state of the spill. However, the public was not notified until the pollution reached Harbin on November 21 (Green, 2009). Initially, the Harbin Municipal Government informed residents that tap water would not be available for four days, on account of routine maintenance on the city's water supply facility (*Harbin People's Government*, 2005). But because of increasing scepticism fuelled by the news media, the government reversed itself and issued an emergency statement declaring that the explosion at CNPC had indeed resulted in toxic water pollution (Chen, 2009).

As the toxic chemicals made their way downstream toward Harbin, it was clear that the river pollution posed a much greater health threat in a much wider area than the regional government had suggested. On November 24, nine days after the accident, the Chinese Foreign Minister Li Zhaoxing gave a "rare and well publicized apology" to the Russian ambassador and offered assistance in preventing the further spread of the pollutants (Jie, 2006). Chinese President Hu Jintao was determined to

maintain peaceful Sino-Russian relations. "We will take all necessary and effective measures and do our utmost to minimize the pollution and reduce the damage to the Russian side (UNEP, 2005). President Hu also provided Russia water testing and purifying equipment (Chen, 2009) and 3,000 Chinese nationals were enlisted to build a dam along the Fuyuan waterway linking the Heilong and the Ussuli rivers, in order to protect the water supply of Khabarovsk (Kirschner & Grandy, 2006).

Meanwhile, back home the public's anger over the government's apparent mishandling of the crisis was growing. Much confusion was evident over who's to blame for the disaster, as if assigning blame would undo the damage caused by water pollution. Some news media criticized officials who initially lied about the extent of the pollution. Beijing's *Zhongguo Jingji Shibao* (*China Economic Times*), for example, editorialized: "If individual leaders tell irresponsible lies, [it] is an extremely terrible crime against society because any rumor could trigger a social disaster! [The pollution cover up] is about to come out into the open and by then those who have lied will certainly be punished severely" (*BBC*, 2005b). When the Chinese government did move to punish those responsible for the Songhua River crisis, it also issued an unprecedented warning: "Any cover-up of the accident and any negative attitude toward the probe will be considered cheating the public and ignoring the authority of the government," announced Li Yizhong, Secretary General of the State Production Safety Supervision Agency and head of the Songhua investigative team (Pan, 2005).

Once the immediate problem of minimizing the damage caused by the spill had passed, China's Ministry of Environmental

Protection (MEP) initiated a series of measures to clean up the Songhua River. Although a total of 7.84 billion yuan were committed to this, the government's efforts still met with a degree of skepticism from environmental experts (*Globaltimes*, 2011). For example, Gu Jidong, an environmental toxicology expert based in Hong Kong and a Harbin native, explained that the effects of the pollution would occur in two phases. First is watercourse pollution, and then riverbed pollution. "It is not as simple as saying that the chemicals have now passed the city and the water is now safe," said Gu. "The local government is talking about the first stage but not about the second stage." Removing toxins gradually released by the riverbed would require a long-term commitment to cleanup operations (*Asia Times*, 2005). But there is ample evidence since then suggesting that the MEP has begun to address both stages, and in so doing is creating a model for managing environmental protection efforts that can be used to address similar problems in other parts of China.[5]

The change in policy required a comprehensive reassessment of China's previous development model and the lack of incentives for local government officials to focus on any goal other than annualized growth in GDP (Zhou, 2011). The reassessment began with statements released by the Party and the State Council admitting that SEPA "did not attach enough importance to the [Songhua] accident and did not adequately anticipate the possible severe consequences of the accident, and therefore should be held responsible for the losses" (Jie, 2006). In response to these negative statements, Xie Zhenhua resigned from his position as director of SEPA. Following Xie's resignation, the State Council released "The Decision on Implementing the Scientific Concept

of Development and Stepping Up Environmental Protection," which is truly a landmark in China's struggle to demonstrate a serious commitment to environmental protection. The "Decision" document highlighted environmental issues needing immediate attention, including drinking water safety, river basin contamination control, and water pollution prevention and response (*World Bank*, 2007).

In January 2006 the Songhua basin was officially registered on the priorities listing for programs in the Five-Year Plan supporting Chinese water pollution control and prevention, and a new approach to pollution prevention plan was drafted. Zhou Shengxian, newly appointed director of SEPA, asserted that the plan's main aim was "to let all people drink clean water" (Li, 2006). As part of this initiative, 11 enterprises were publicly reprimanded by SEPA for creating environmental hazards and an additional 127 chemical plants were subjected to environmental risk examination (*World Bank*, 2007). Since 2007, SEPA has closed down an additional 316 plants and suspended 513 plants involved in pollution related challenges (*Xinhua*, 2009a).

Besides demanding changes in the way industrial plants managed the pollutants they were generating, *China Daily* indicated the need for increased coordination among local departments and regulatory bodies, and suggested that companies should be sanctioned more heavily for failing to live up to their individual responsibilities (Jiang, 2006). When SEPA issued its year-end report in 2006, the results were still not satisfactory, for even a full year after the Songhua disaster, similar incidents, albeit of much smaller scope, occurred every two to three days throughout China (*Xinhua*, 2006b). The intractability of China's pollution

problem, according to Guo Huaicheng of Peking University, can only be overcome by seeking to balance economic growth with greater environmental sensitivity. Guo believes that Chinese grassroots initiatives may help restore the proper balance: "The Chinese people, or at least the Chinese media, are becoming more and more alert to environmental problems and are now a strong force in China's environmental protection campaign" (*Xinhua*, 2006a). SEPA's newly appointed director, Zhou Shengxian, apparently agrees with Guo that environmental protection should become everyone's business. During an onsite visit to Jiamusi City in Heilongjiang Province, Zhou said, "The pollution of the Songhua River water is a pain like cutting flesh …. Businesses shouldn't pose development against environmental protection" (Jing, 2005).

The total costs of the Songhua River disaster are still being calculated. Pollutants embedded in the riverbank may slowly be released from the soil for years to come, causing further damage to human health and local agriculture. In Harbin, for example, during its four days without running water 29 companies completely stopped production while 23 others slowed production. The average loss during the period was almost 100 million yuan a day (Chen, 2009). According to the *China Economic Times*, the direct costs related to the river pollution amounted to 1.5 billion *yuan*, although indirect costs remain too difficult and long-term to calculate (Chen, 2009). Although the CNPC paid the highest fine at that time under Chinese environmental law for polluting the Songhua River basin — a mere 1 million *yuan* — a debate ensued regarding who should bear the costs for cleaning up the pollution. Provincial enforcement was criticized as too outdated to meet present needs. Among the critics was Wang

Jin, who sued the CNPC for an additional payment of 10 billion *yuan*. Such an amount would represent a realistic assessment of the damages inflicted by the firm's activities; however, Wang's case was rejected in court (*Asia News*, 2007).

Despite such setbacks, Wen Bo, an activist representing Pacific Environment — an environmental organization based in San Francisco, California — declared "many local people actually think this pollution accident was a blessing in disguise" (*Worldwatch Institute*). As a result of the Songhua River disaster certain changes occurred in China's environmental policies that, however subtle, may actually yield long-term improvement. First of all, in 2008 SEPA became a cabinet level Ministry of Environmental Protection (MEP). The new agency reports directly to the State Council, China's chief administrative authority, and is responsible for implementing the nation's environmental policies and enforcing all relevant laws and regulations. The change is status for this department is more than a mere name change. The five regional environmental inspection and enforcement centers now must report directly to the MEP, and not to the provincial governments. The MEP apparently will now be able to demand compliance at the provincial and regional levels in ways that seemed impossible in the previous administrative structure.

The MEP has also been active internationally, having secured funds for a joint pollution prevention program from the Asian Development Bank (ADB), whose 2011 Report confirms substantial progress in developing effective water pollution control infrastructure for Jilin and the surrounding area. The ADB had approved loans of up to US $146.6 million to

Tongfang Water Engineering (TWE), which was charged with the task of restoring the water supply and water treatment in the Songhua Basin. The ADB's investment was used to construct an additional 70 urban sewage treatment plants with an impressive daily water processing capacity of 295 million tons. The treatment plants span all 36 counties along the Songhua River basin (*Xinhua*, 2009b). Philip Erquiaga of the ADB believes this project would change the lives of people living around the Songhua River: "Treating more waste water and improving the supply of potable water will reduce pollution in the urban environment around the Songhua River Basin and improve the health and quality of life for millions of residents" (*WASH* News, 2010).

Like many other environmental disasters, the Songhua River incident was a result of human error. However, the resulting social panic, widespread pollution and ineffective cover-up brought international attention to China's environmental protection policies. Galvanized into action by the glare of publicity, the Chinese government responded by instituting new policies designed to guarantee greater accountability short-term and minimize the chance of such disasters long-term. These events, on the one hand, illustrate the extensive consequences one company's negligence can have, while on the other hand they also demonstrate how genuine change for the better can result once both business and government recognize the true costs of paying only lip service to environmental responsibility. The change underway in China, as a result of the actions taken in response to the Songhua River disaster, may yet turn out to be a "blessing in disguise," not only for alerting everyone of the need to concern ourselves with preserving the natural

environment, but also for improving the health of Chinese and foreign citizens, as well as national and international political and social relations.

Sustainting Environmental Responsibility

The Songhua River disaster, to be sure, is not the greatest environmental disaster ever endured by China, and it certainly is not the greatest ever in the world. For sheer loss of life and horrible long-term consequences, the explosion at the Union Carbide plant in Bhopal, India, in 1984 remains the worst ever, with basic questions of moral and legal responsibility — not to mention the completion of an effective cleanup effort — still not fully resolved (*The Hindu*, 2014). Nor are such disasters still only occurring in developing countries like China and India. The Upper Big Branch Mine disaster that happened in West Virginia in 2010 involved the death of 29 of the 31 miners at the site (*Charleston Gazette*, 2014), the worst coal mine disaster in the USA since 1970. In both the Bhopal and Upper Big Branch explosions, the firms involved — Union Carbide and Massey Energy — have had to answer charges of criminal liability for their negligence. Compared to the ways these businesses have responded to the disasters resulting from their operations, after a shaky start both the CNPC and the MEP seem to have turned over a new leaf when it comes to addressing the need for environmental protection.

The challenge, of course, is how to sustain a fresh commitment to environmental responsibility once the pressures of responding to an immediate catastrophe have subsided. This is particularly difficult when the challenges are global and pervasive, and

too subtle to impress the minds of busy, very busy, people. Global warming and catastrophic climate change is one telling example. The threat to ordinary people living along the Songhua River or in close proximity to the Bhopal plant or the damages inflicted upon coastal communities inundated by the BP disaster in the Gulf of Mexico are clear and present, calling for an immediate response. But when the threat is to be inferred primarily from computer generated projections assessing the long-term consequences of glacial melting and disturbances in ocean currents, when the most vivid evidence presents itself in terms of the increasing frequency of severe droughts in some place and record breaking rainfall in others, severe heat waves here and unusually cold weather there, once in a generation typhoons and hurricanes, and other unusual weather events — any and all of which can be explained away by those who just won't see what's coming, the challenge of sustaining a commitment to environmental responsibility becomes particularly daunting.

One great lesson from the Songhua River catastrophe is that environmental responsibility is everybody's business, and not just the government's. Facing up to the challenge of cleaning up after the disaster meant not only restructuring the relationships among various governmental agencies in China, but also achieving new levels of cooperation internationally, as well as openness and transparency in public relations at all levels, in the hope of mobilizing an emerging civil society consisting of NGOs, businesses and philanthropic organizations that might contribute to a real improvement in the situation. If environmental responsibility is everybody's business, then sustaining it will require a transformation in the way people think about human society and the earth from which it emerged. If the

Songhua River disaster is to become a "blessing in disguise," it must become the impetus for an educational revolution capable of sustaining a commitment to environmental responsibility that transcends efforts to clean things up after a disaster, whatever its causes.

The resources for an educational revolution may be closer to hand than casual observers imagine, namely, in China's own moral and spiritual traditions as enshrined in its legally recognized religions. While these — Daoism, Buddhism, Catholicism, Protestantism, and Islam — are historically and philosophically diverse, they, along with Confucian moral philosophy, provide the foundations for a much needed reassessment of the relationship between humanity and the natural environment that will take us beyond the unthinking and unrestrained exploitation of the earth, the air and water that sustain us, and toward a relationship of respectful cultivation or stewardship that is consistent with the Way (*Dao*) of true wisdom. We believe that it is only through interreligious dialogue and collaboration, with all spiritual traditions cooperating in the great work of whole person education that the Chinese people will be enabled to sustain a serious commitment to environmental responsibility. In what follows we focus on the resources of Catholic Social Teaching in particular, not because we believe these are exclusively superior and all-sufficient, but because they are so little understood even among Chinese Catholics. First introduced by China's great foreign friends — Fr. Matteo Ricci, SJ (*Li Ma Tou*) and the Jesuits — this tradition and its own effort to meet today's challenge of environmental responsibility may be particularly relevant as the one foreign social philosophy that is closest in spirit to Confucianism. We present this outline as

a resource for mapping China's own sustainable development in the 21st century.

CST's Long March Toward Environmental Responsibility

Catholic Social Teaching (CST) is the body of official statements issued occasionally by reigning Popes, Ecumenical Councils, and regional Bishops' Conferences on major questions of public policy regarded by the Catholic Church as morally and spiritually significant. CST began during the reign of Pope Leo XIII (1878-1903) who, after the collapse of the Papal States in Italy, was determined to use his authority to address the challenges of modernization and industrialization on the basis of the Church's understanding of natural law — or, if you will, universal values — informed by both Scripture and Tradition. While some aspects of CST directly address lingering questions about the role of the Church in the modern, secular world, the major focus then as now is on the quality of life enjoyed or endured by ordinary people, particularly the poor and the marginalized. While this concern was common to virtually all social ideologies competing for political influence in 19th century Europe, CST held out a vision of society that was religiously based and respectful of the role of families and their traditional rights and responsibilities. It therefore posed itself as an alternative to the radical programs advanced under the banners of socialism, Marxism, liberalism, nationalism and imperialism. It approached the social question — namely the plight of the poor and those whose lives were caught up in the industrial revolution, for good or for ill — not on the assumption that class struggle was historically inevitable but on the hope that social harmony could be achieved by enabling the conflicting interests of all parties to be negotiated

through peaceful dialogue and non-violent forms of concerted action.

In 1891 Pope Leo XIII issued an encyclical letter, *Rerum Novarum*, on the condition of the working classes that is regarded as the point of departure for CST. To this day, *Rerum Novarum* is honoured for its defense of both the natural right to acquire and own property and the right of all people to a fair share of the fruits of this earth. The letter sympathized with the sufferings of industrial laborers and their families, and advocated many of the social welfare policies that would be institutionalized in most industrialized States throughout the 20th century. It recognized the workers' right of free association in unions and cooperatives, but saw these as open to the participation of business owners and managers so that they might all achieve mutual understanding and solidarity with one another. Above all, *Rerum Novarum* enunciated certain basic and universal principles such as respect for human dignity and a commitment to the common good, as well as the rights and responsibilities that naturally follow from these principles.

Although *Rerum Novarum* was not specifically concerned with questions of environmental responsibility that were to become a top priority a century later, it did ground the right to private property in a particular understanding of humanity's relationship with the natural environment.

> The fact that God has given the earth for the use and enjoyment of the whole human race can in no way be a bar to the owning of private property. For God has granted the earth to mankind in general, not in the sense

> that all without distinction can deal with it as they like, but rather that no part of it was assigned to any one in particular, and that the limits of private possession have been left to be fixed by man's own industry, and by the laws of individual races. Moreover, the earth, even though apportioned among private owners, ceases not thereby to minister to the needs of all, inasmuch as there is not one who does not sustain life from what the land produces. Those who do not possess the soil contribute their labor; hence, it may truly be said that all human subsistence is derived either from labor on one's own land, or from some toil, some calling, which is paid for either in the produce of the land itself, or in that which is exchanged for what the land brings forth. (*Rerum Novarum*, 1891, paragraph 8)

While the earth sustains everyone, private ownership can be recognized based on the labor invested in cultivating it, and not just for one's own benefit. Private property rights therefore cannot be absolute, since ownership itself is contingent upon nature's own purpose, which has been ordained by God for the use and enjoyment of the whole human race. Given nature's purpose, any wanton exploitation of the earth exclusively for one's own private benefit is immoral.

Rerum Novarum's vision of the meaning of human life and its limits is emphatically theocentric. Human beings are an indispensable element in God's plan of Creation:

> Life on earth, however good and desirable in itself, is not the final purpose for which man is created; it is only the

> way and the means to that attainment of truth and that love of goodness in which the full life of the soul consists. It is the soul which is made after the image and likeness of God; it is in the soul that the sovereignty resides in virtue whereof man is commanded to rule the creatures below him and to use all the earth and the ocean for his profit and advantage. "Fill the earth and subdue it; and rule over the fishes of the sea, and the fowls of the air, and all living creatures that move upon the earth" (Genesis 1:28).In this respect all men are equal….no man may with impunity outrage that human dignity which God Himself treats with great reverence, nor stand in the way of that higher life which is the preparation of the eternal life of heaven. Nay, more; no man has in this matter power over himself. To consent to any treatment which is calculated to defeat the end and purpose of his being is beyond his right; he cannot give up his soul to servitude, for it is not man's own rights which are here in question, but the rights of God, the most sacred and inviolable of rights. (*Rerum Novarum*, 1891, paragraph 40)

Nature discloses the fact that there is an objective order in Creation, that each thing — including all living beings as well as of humanity — has a purpose which cannot be ignored or set aside. Since no one but God owns the earth, humanity's use of its resources must strictly adhere to God's purpose, for all "striving against nature is in vain." (*Rerum Novarum*, 1891paragraph 17)

Though some environmentalists today may dismiss such ideas as "anthropocentric" — even granted their theocentric premiss — the fact is that even at this early stage, CST was clearly committed to an ethic of stewardship:

> To sum up, then, what has been said: Whoever has received from the divine bounty a large share of temporal blessings, whether they be external and material, or gifts of the mind, has received them for the purpose of using them for the perfecting of his own nature, and, at the same time, that he may employ them, as the steward of God's providence, for the benefit of others.(*Rerum Novarum*, 1891, paragraph 22)

Stewardship, then, is a commitment to managing the earth's resources ultimately for the benefit of all humanity, consistent with God's purposes as discovered through critical reflection on the natural laws governing all of Creation. What it means concretely to live by such an ethic of stewardship is left rather sketchy in *Rerum Novarum*, but it clearly involves an agenda that focuses on the role of primary institutions like the family and the Church, as well as voluntary associations dedicated to addressing the social question.

So impressive was the impact of *Rerum Novarum*, at least in Europe and the Americas, that it became honored as point of departure for the elaboration of CST. On the fortieth anniversary of its release, in 1931, Pope Pius XI (1922–1939) issued an encyclical letter, *Quadragesimo Anno*, intended not only to commemorate Pope Leo's breakthrough but also to update it in light of the global struggles that had precipitated World War I and the subsequent rise of both Marxist socialism and Fascism. Given that these opposed ideologies also claimed to address the social question raised by the inequities of the industrial revolution, doing so by proposing unprecedented interventions on the part of the State to restructure society or reengineer basic

social relationships, *Quadragesimo Anno* sought to define an alternative that would engage all the resources of civil society while also restricting State intervention as much as possible. The Principle of Subsidiarity was meant to address the question of how, precisely, all the various institutions should function properly to address the existential challenges to human development that had emerged in modern industrial societies.

While the Principle of Subsidiarity is premised on the same theocentric vision of humanity's relationship with nature that had animated the work of Pope Leo XIII, in *Quadragesimo Anno* the focus rests on the social order and how it is to be reconstructed. That order remains objective and evident in nature's own laws, understood in light of Scripture and Tradition. But if critical reflection yields an understanding of God's purpose in creating the earth and establishing humanity's right relationship with it, the need was to define how the proper ordering among human institutions — ranging from natural associations like the family to the larger and more powerful agencies of the State, as well as business corporations, labor unions and civic organizations — should be conceived. Although *Quadragesimo Anno* clearly rejects Statism in both its leftwing and rightwing variations, it does not offer a clear picture of the alternative, except to insist that the interventions of "higher" institutions such as the State should not usurp the functions of "lower" or primary institutions such as the family.

> As history abundantly proves, it is true that on account of changed conditions many things which were done by small associations in former times cannot be done now save by large associations. Still, that most weighty

> principle, which cannot be set aside or changed, remains fixed and unshaken in social philosophy: Just as it is gravely wrong to take from individuals what they can accomplish by their own initiative and industry and give it to the community, so also it is an injustice and at the same time a grave evil and disturbance of right order to assign to a greater and higher association what lesser and subordinate organizations can do. For every social activity ought of its very nature to furnish help to the members of the body social, and never destroy and absorb them. (*Quadragesimo Anno*, 1931, paragraph 79)

The analogy is striking: just individual persons should not be prevented from accomplishing what they can and should do for themselves, so higher associations should not usurp the functions of "subordinate organizations." The analogy suggests a continuum linking individuals, families and the State through the intermediation of various associations, high and low, that perform a "subsidiary function" (*Quadragesimo Anno*, 1931, paragraph 80). The State may possess all the power, understood in terms of the coercive authority of the military and police forces, but neither does it possess all the competence, nor will it ever, even with the most advanced technologies at its disposal.

At the time *Quadragesimo Anno* was published, the Church was not yet aware of the environmental crisis. Its chief concern was to safeguard the rights and responsibilities of parents to educate their children, particularly in moral and religious values. Traditionally, the Church had a major role to play in the education of children and no doubt the Pope thought that its educational role was a fitting example of an institution properly

carrying out its subsidiary function in support of Catholic families. Even so, by the same logic, given the challenge that the environmental crisis represents for all of humanity, it is clear that the Church is seeking ways to support individuals and families through its educational institutions by effecting a transformation in human consciousness sufficient to sustain a serious commitment to environmental responsibility. How the basic principles of CST — human dignity, the common good, solidarity and the principle of subsidiarity — are now being interpreted as supportive of an ethic of environmental responsibility is the next step in this story. The point to this recollection of the prehistory of CST's environmental perspective is to suggest that there has been a "Long March" undertaken within the tradition for the sake of future generations.

Environmental Responsibility And 'Integral Human Development'

Though previous Popes had noted the costs of environmental degradation and how these imposed unfair burdens upon the poor and the marginalized,[7] Pope John Paul II (1978 – 2005) was the first to focus CST fully on the challenge of the environmental crisis as such. A sign of things to come was his homily at a mass at the Living History Farms of Des Moines, Iowa, USA, in which he saluted the farmers for their special role in cultivating the earth, thus making human life sustainable. He cited three attitudes characteristic of farmers that everyone should learn from: first, gratitude to God, acknowledging our absolute dependence upon His gift of Creation; second, a sense of one's stewardship demonstrated through farming practices that conserve the land for future generations; and third, a sense

of generosity expressed in their commitment "to provide food for the millions who have nothing to eat and thus help to rid the world of famine" (John Paul II, 1979). The ethic of stewardship that the Pope envisioned for farmers, would soon form the nucleus ethic of environmental responsibility incumbent upon all people.

The first full statement of this perspective was delivered in John Paul II's annual declaration for the World Day of Peace on the 1st of January, 1990, "Peace with God the Creator, Peace with All of Creation" (John Paul II, 1990). By that time the catastrophic nature of the environmental crisis had become crystal clear to the Pope and his advisors at the Pontifical Academy of the Sciences.

Characteristically, the declaration begins with a meditation on Creation, in which the basic presuppositions of CST are marshalled in support of an ethic of environmental responsibility. For the Pope, the ecological crisis is at its root a moral and spiritual problem caused by "a lack of due respect for nature by the plundering of natural resources and by a progressive decline in the quality of life":

> Faced with the widespread destruction of the environ ment, people everywhere are coming to understand that we cannot continue to use the goods of the earth as we have in the past…This has led to the painful realization that we cannot interfere in one area of the ecosystem without paying due attention both to the consequences of such interference in other areas and to the wellbeing of future generations. The gradual depletion of the ozone

> layer and the related "greenhouse effect" has now reached crisis proportions as a consequence of industrial growth, massive urban concentrations and vastly increased energy needs. Industrial waste, the burning of fossil fuels, unrestricted deforestation, the use of certain types of herbicides, coolants and propellants: all of these are known to harm the atmosphere and environment. The resulting meteorological and atmospheric changes range from damage to health to the possible future submersion of low-lying lands. While in some cases the damage already done may well be irreversible, in many other cases it can still be halted. It is necessary, however, that the entire human community - individuals, States and international bodies - take seriously the responsibility that is theirs. (John Paul II, 1990, paragraphs 1 and 6)

The Pope's message, therefore, focuses on offering the resources of CST to assist all people in facing up to this responsibility. The basic principles for a sustainable commitment to environmental responsibility must begin with "respect for life":

> Respect for life, and above all for the dignity of the human person, is the ultimate guiding norm for any sound economic, industrial or scientific progress. The complexity of the ecological question is evident to all. There are, however, certain underlying principles, which, while respecting the legitimate autonomy and the specific competence of those involved, can direct research towards adequate and lasting solutions. These principles are essential to the building of a peaceful society; no peaceful society can afford to neglect either respect for

> life or the fact that there is an integrity to creation. (John Paul II, 1990, paragraph 7)

As he goes on to say in commending St. Francis of Assisi, as the newly designated patron saint of those who promote ecology, "when we are at peace with God we are better able to devote ourselves to building up that peace with all creation which is inseparable from peace among all peoples" (John Paul II, 1990, paragraph 16).

What concretely the Pope has in mind is two things. First, a massive change of heart capable of sustaining a change of lifestyle in which "simplicity, moderation and discipline, as well as a spirit of sacrifice, must become a part of everyday life lest all suffer the negative consequences of the careless habits of a few." No amount of new legislation or more rigorous enforcement of existing laws will succeed unless there is a new universal attitude. But how will such a change occur? The Pope offers the services of the Church in cooperation with other religions as well as civic associations to make this change a focus for educational reform:

> An education in ecological responsibility is urgent: responsibility for oneself, for others, and for the earth. This education cannot be rooted in mere sentiment or empty wishes. Its purpose cannot be ideological or political. It must not be based on a rejection of the modern world or a vague desire to return to some "paradise lost." Instead, a true education in responsibility entails a genuine conversion in ways of thought and behaviour. Churches and religious bodies, non-governmental and governmental

> organizations, indeed all members of society, have a precise role to play in such education. The first educator, however, is the family, where the child learns to respect his neighbour and to love nature. (John Paul II, 1990, paragraph 13)

The specifics of how such an effort would be organized globally receive only sketchy treatment in this declaration. But what is said is clearly an illustration of the Vatican's ongoing commitment to CST's Principle of Subsidiarity. For the solution to the ecological crisis does not require the establishment of world government, or the triumph of any one religion's theocratic agenda; instead a "coordinated" approach negotiated among all responsible States and institutions can and ought to move us forward:

> In many cases the effects of ecological problems transcend the borders of individual States; hence their solution cannot be found solely on the national level. Recently there have been some promising steps towards such international action, yet the existing mechanisms and bodies are clearly not adequate for the development of a comprehensive plan of action. Political obstacles, forms of exaggerated nationalism and economic interests - to mention only a few factors - impede international cooperation and long-term effective action. The need for joint action on the international level does not lessen the responsibility of each individual State. Not only should each State join with others in implementing internationally accepted standards, but it should also make or facilitate necessary socio-economic adjustments within its own

> borders, giving special attention to the most vulnerable sectors of society. The State should also actively endeavour within its own territory to prevent destruction of the atmosphere and biosphere, by carefully monitoring, among other things, the impact of new technological or scientific advances. The State also has the responsibility of ensuring that its citizens are not exposed to dangerous pollutants or toxic wastes. The right to a safe environment is ever more insistently presented today as a right that must be included in an updated Charter of Human Rights. (John Paul II, 1990, paragraph 9)

In other words, the resources for responding to the environment crisis are already available, but to implement them effectively the nations and peoples of this earth must achieve a new sense of global solidarity based on establishing mutual trust and a renewed commitment to the common good.

A dozen years later, in the twilight of his Papacy, John Paul II was still at it, promoting an ecumenical consensus to support an ethic of environmental responsibility. In the "Common Declaration of John Paul II and the Ecumenical Patriarch His Holiness Bartholomew I," they confess their common faith in God the Creator and their hope that "His design … will be realized through our co-operation in restoring its original harmony." At the end of their "Common Declaration," they insist that there is no reason for panic or paralyzing despair, if only humanity will wake up to the clear and present danger, and make environmental responsibility its top priority: "It is not too late. God's world has incredible healing powers. Within a single generation, we could steer the earth toward our children's future. Let that generation

start now, with God's help and blessing." (John Paul II and Bartholomew I, Common Declaration, 2002)

Grounded in that hope, the two religious leaders offer six goals that they believe will make an environmental ethic practicable.

- First is to "think of the world's children" whenever we consider the policies and actions required to meet the crisis.
- Second is to recover a vivid sense of "the true values based on the natural law that sustain every human culture."
- Third is "to use science and technology in a full and constructive way, while recognizing that the findings of science have always to be evaluated in the light of the centrality of the human person, of the common good and of the inner purpose of creation." Once again it is taking responsibility for "our children" that should guide our use of science and technology.
- Fourth is to recover a sense of humility regarding "what we choose to regard as our property during our brief stay on this earth. We have not been entrusted with unlimited power over creation; we are only stewards of the common heritage."
- Fifth is to "acknowledge the diversity of situations and responsibilities in the work for a better world environment." It is this diversity — particularly the differences between "the most affluent societies" and the rest of humanity — that will call for wise and effective policy-making consistent with the Principle of Subsidiarity.
- Sixth is to expect "disagreement and learn how to respond to it constructively, trusting "in the capacity of human reason and the path of dialogue to reach agreement." Consistent

> with their faith commitment, they pledge and urge everyone to "respect the views of all who disagree with us, seeking solutions through open exchange, without resorting to oppression and domination." (John Paul II and Bartholomew I, Common Declaration, 2002).

As we have learned to expect, any approach to the environmental crisis consistent with CST must be non-violent, committed to dialogue based on mutual respect, and empowering toward the participation of all institutions in an emerging and globalizing civil society.

The most systematic statement of CST's perspective on environmental responsibility comes when Pope Benedict XVI (2005–2013) issued his major social encyclical, *Caritas in Veritate* (2009). Ostensibly an anniversary commemorative of Pope Paul VI's *Populorum Progressio*, "On the Development of Peoples" (1967), Pope Benedict's letter follows two crucially important leads provide by Pope Paul, namely the achievement of a truly global perspective on the social question well beyond the comparatively Eurocentric focus on CST prior to Vatican Council II (1962-1965), and the assertion of a normative concept of development that is inclusive of moral, spiritual and cultural concerns, as well as the traditional focus on social and economic justice. Under the banner of "integral human development," Pope Benedict devotes an entire chapter to humanity's rights and duties toward the environment (*Caritas in Veritate*, 2009, paragraphs 48-51).

While the term, "integral human development" does not appear in *Populorum Progressio*, Pope Benedict presents it as the unifying

theme of *Caritas in Veritate*. As a normative concept, "integral human development" challenges some notions of development, and points instead to the necessity of a transcendental or theocentric presupposition to make development authentically human:

> Man does not develop through his own powers, nor can development simply be handed to him. In the course of history, it was often maintained that the creation of institutions was sufficient to guarantee the fulfillment of humanity's right to development. In reality, institutions by themselves are not enough, because integral human development is primarily a vocation, and therefore it involves a free assumption of responsibility in solidarity on the part of everyone. Moreover, such development requires a transcendent vision of the person, it needs God. (*Caritas in Veritate*, 2009, paragraph 11)

Pope Benedict here underscores the practical consequences of atheism or the denial of the reality of God. If God's gift of Creation is not acknowledged in all its aspects, development is "entrusted exclusively to man, who falls into the trap of thinking he can bring about his own salvation…." This is why education based on the truth about humanity's role in Creation is so important:

> When the State promotes, teaches, or actually imposes forms of practical atheism, it deprives its citizens of the moral and spiritual strength that is indispensable for attaining integral human development... In the context of cultural, commercial or political relations, it also sometimes happens that economically developed or

> emerging countries export this reductive vision of the person and his destiny to poor countries. This is the damage that "superdevelopment" causes to authentic development when it is accompanied by "moral underdevelopment." (*Caritas in Veritate*, 2009, paragraph 29)

Integral human development, then, "demands respect for its truth." That truth, as embraced in the tradition of CST, consists in a recognition of humanity's absolute dependence on God and interdependence with all people, indeed, with the whole of Creation:

> Amid the various competing anthropological visions put forward in today's society, even more so than in Paul VI's time, the Christian vision has the particular characteristic of asserting and justifying the unconditional value of the human person and the meaning of his growth. The Christian vocation to development helps to promote the advancement of all men and of the whole man. (*Caritas in Veritate*, 2009, paragraph 18)

Pope Benedict explains the ultimate basis for the Christian vocation to development in terms of love and truth:

> Truth, and the love which it reveals, cannot be produced: they can only be received as a gift. Their ultimate source is not, and cannot be, mankind, but only God, who is himself Truth and Love. This principle is extremely important for society and for development, since neither can be a purely human product; the vocation to development on the part of individuals and peoples is not based

> simply on human choice, but is an intrinsic part of a plan that is prior to us and constitutes for all of us a duty to be freely accepted. That which is prior to us and constitutes us — subsistent Love and Truth — shows us what goodness is, and in what our true happiness consists. *It shows us the road to true development.* (*Caritas in Veritate*, 2009, paragraph 52)

With love and truth grounding one's vision of integral human development, the enabling role of the sciences becomes clear. They are necessary but not sufficient for making progress on the path toward development:

> Human knowledge is insufficient and the conclusions of science cannot indicate by themselves the path towards integral human development. There is always a need to push further ahead: this is what is required by charity in truth. Going beyond, however, never means prescinding from the conclusions of reason, nor contradicting its results. Intelligence and love are not in separate compartments: *love is rich in intelligence and intelligence is full of love.*[8] (*Caritas in Veritate*, 2009, paragraph 30)

There is, in short, no conflict between truth and love, between reason and faith, or between science and theology. The Vatican's well-established relationship to the scientific debate over the environmental crisis and the possibility of catastrophic climate change — Galileo or no Galileo — is no anomaly.

Given these presuppositions, the vision of environmental responsibility offered in *Caritas in Veritate* is clear and consistent:

> Today the subject of development is also closely related to the duties arising from *our relationship to the natural environment*. The environment is God's gift to everyone, and in our use of it we have a responsibility towards the poor, towards future generations and towards humanity as a whole. When nature, including the human being, is viewed as the result of mere chance or evolutionary determinism, our sense of responsibility wanes. In nature, the believer recognizes the wonderful result of God's creative activity, which we may use responsibly to satisfy our legitimate needs, material or otherwise, while respecting the intrinsic balance of creation. If this vision is lost, we end up either considering nature an untouchable taboo or, on the contrary, abusing it. Neither attitude is consonant with the Christian vision of nature as the fruit of God's creation. (*Caritas in Veritate*, 2009, paragraph 48)

But what besides conversion to "the Christian vision of nature" does Pope Benedict have in mind? Embracing the vision involves a profound recognition of the interdependence of humanity and the natural environment. The human ecology and the environmental ecology are one and the same:

> In order to protect nature, it is not enough to intervene with economic incentives or deterrents; not even an pposite education is sufficient. These are important steps, but *the decisive issue is the overall moral tenor of society*. If there is a lack of respect for the right to life and to a natural death, if human conception, gestation and birth are made artificial, if human embryos are sacrificed to research, the conscience of society ends up

> losing the concept of human ecology and, along with it, that of environmental ecology. It is contradictory to insist that future generations respect the natural environment when our educational systems and laws do not help them to respect themselves…. Our duties towards the environment are linked to our duties towards the human person, considered in himself and in relation to others. It would be wrong to uphold one set of duties while trampling on the other. Herein lies a grave contradiction in our mentality and practice today: one which demeans the person, disrupts the environment and damages society. (*Caritas in Veritate*, 2009, paragraph 51)

Overcoming this contradiction will only happen when we are prepared to make a change in "life-style":

> What is needed is an effective shift in mentality which can lead to the adoption of *new life-styles* "in which the quest for truth, beauty, goodness and communion with others for the sake of common growth are the factors which determine consumer choices, savings and investments." Every violation of solidarity and civic friendship harms the environment, just as environmental deterioration in turn upsets relations in society. Nature, especially in our time, is so integrated into the dynamics of society and culture that by now it hardly constitutes an independent variable. (*Caritas in Veritate*, 2009, paragraph 51)

No doubt, such a transformation is not likely to occur without a lot of help, which is the point of ordering responsibilities according to the Principle of Subsidiarity.

Consistent with subsidiarity and solidarity, Pope Benedict calls for a thoroughgoing reform of the United Nations and other international organizations that support member States in achieving their legitimate purposes:

> In the face of the unrelenting growth of global interdependence, there is a strongly felt need, even in the midst of a global recession, for a reform of the *United Nations Organization*, and likewise of *economic institutions and international finance*, so that the concept of the family of nations can acquire real teeth….*To manage the global economy; to revive economies hit by the crisis; to avoid any deterioration of the present crisis and the greater imbalances that would result; to bring about integral and timely disarmament, food security and peace; to guarantee the protection of the environment and to regulate migration: for all this, there is urgent need of a true world political authority*,… regulated by law, to observe consistently the principles of subsidiarity and solidarity, to seek to establish the common good, and *to make a commitment to securing authentic integral human development inspired by the values of charity in truth*." (*Caritas in Veritate*, 2009, paragraph 67)

The "real teeth" that Benedict calls for would mean a United Nations whose authority is universally recognized "with the effective power to ensure security for all, regard for justice, and respect for rights." As he goes on to observe, "Obviously it would have to have the authority to ensure compliance with its decisions from all parties, and also with the coordinated measures adopted in various international forums." Progress on any of the pressing

international concerns of the day, including especially the environmental crisis, requires "the establishment of a greater degree of international ordering, marked by subsidiarity, for the management of globalization." In Pope Benedict's view, such a reform would simply mark a return to the task of constructing "a social order that at last conforms to the moral order… as envisaged by the Charter of the United Nations."

Those familiar with the Vatican's policies since World War II, as enshrined in CST, will not at all be surprised either by Pope Benedict's robust hope for the reform of the United Nations, or by his insistence that such a development would be consistent with the Principle of Subsidiarity. The rule of law, fairly regulated through the United Nations, is a necessary, though hardly sufficient element in implementing an ethic of responsibility. Even compliance requires cooperation, which is not likely to be forthcoming apart from coordinated efforts at educating all peoples. The educational effort is not likely to be effective apart from a coordinated effort to enlist the support of all the world's major religious and spiritual traditions. The bottom line for CST is that the Catholic Church is prepared not only to participate in such an effort, but also to use its own global reach to assist in its organization.

The Vatican's Conference On Climate Change: A Gift From Pope Francis

When Pope Benedict retired in 2013, the Cardinal Archbishop of Buenos Aires, Argentina, Jorge Mario Bergoglio, S.J., was elected, and took the name of Pope Francis I. Everything about Pope Francis appears to be a radical new departure for

the Papacy. Bergoglio is the first Jesuit Pope, the first non-European in over 1,200 years, the first Latin American, and the first to honor St. Francis of Assisi by taking his name. Pope Francis' commitment to environmental responsibility, while deliberately dramatic, should not be seen as a radical shift in the tradition of CST. Francis' pronouncements on climate change build upon the works of his predecessors, as we have attempted to demonstrate in the previous sections.

Nevertheless, starting with the Pontifical Academy of the Sciences' sponsorship of a "Workshop on Sustainable Humanity, Sustainable Nature: Our Responsibility" in 2014, and most recently a follow-up workshop on "Climate Change and the Common Good: A Statement Of The Problem And The Demand For Transformative Solutions" (29 April 2015), as well as speeches made during his recent visits to Sri Lanka and the Philippines, it is clear that Pope Francis intends to use his personal popularity and his moral authority to galvanize public opinion worldwide in favour of international agreements seeking to stem the tide of catastrophic climate change.

Since it is apparent that any moral appeal for environmental responsibility must be backed up by a mastery of the assured findings of climate science, the Vatican workshops are noteworthy for providing documentation on the deep consensus among scientists on the facts of global warming, that it is caused primarily by human activity, and it results in extreme weather events and related environmental changes. Here is how both the problem and the basic solution are described in the final report from the workshop on "Climate Change and the Common Good":

> In particular, the projected climate changes or, more appropriately, climate disruptions, when coupled with ongoing massive species extinctions and the destruction of ecosystems, will doubtless leave their indelible marks on both humanity and nature. As early as 2100, there will be a non-negligible probability of irreversible and catastrophic climate impacts that may last over thousands of years, raising the existential question of whether civilization as we know it can be extended beyond this century. Only a radical change in our attitude towards Creation and towards our fellow humans, complemented by transformative technological innovations, could reverse the dangerous trends that have already been set into motion inadvertently. (PAS/PASS, "Climate Change and the Common Good," 2015)

While the basic outline of the solution remains the same as that proposed in previous Papal statements, the urgency of the situation is strongly argued, as the Workshop specifically accepts the prediction as "likely" that without a prompt and decisive change in international priorities "the mean global temperature relative to the pre-industrial average by significantly more than 2°C by the end of this century." The final report minces no words in describing the predictable consequences:

> Such a temperature rise, occurring in a warm interglacial epoch that we call the Holocene, has not been seen in tens of millions of years. This creates a serious risk that Earth will cross critical thresholds and tipping points, pushing whole environmental systems, such as rain forests, continental ice sheets, coastal wetlands, monsoon

> patterns and marine food webs into different states or even annihilation. To quote the most recent IPCC (Intergovernmental Panel on Climate Change) Synthesis Report released in 2014: We risk "increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems." (PAS/PASS, "Climate Change and the Common Good," 2015)

Given the risks involved in going over the 2°C threshold for mitigating global warming,[9] the report asserts that "prudence and justice demand that we take note of these risks and act upon them in time, for the sake of all humanity, but especially for the weak, the vulnerable, and the future generations whose wellbeing depends on our generation's actions." But unlike previous statements that were vague about appropriate technological solutions, the report specifically endorses the scientific consensus calling for a shift from fossil fuels to zero-carbon and low carbon sources and technologies, coupled with a reversal of deforestation, land degradation, and air pollution." At the same time, consistent with previous statements informed by CST, the report insists that the solutions also must conform to concerns over social and economic justice prompted by the vast inequities in the global distribution of resources: "In contemplating these needed 'deep de-carbonization' transformations, however, we must not ignore the underlying socio-economic factors that are responsible for our current predicament."[10]

Following up on the Vatican's previous initiatives, "Climate Change and the Common Good" pledges the Catholic Church to work "with the leadership of other religions" to "mobilize public opinion and public funds to meet the energy needs of

the poorest 3 billion in a way that does not contribute to global warming but would allow them to prepare better for the challenges of unavoidable climate change." In addition to cooperating with all other agencies to support a worldwide commitment to "climate-change mitigation" strategies that recognize our "intragenerational" as well as "intergenerational" responsibilities, the report puts the Vatican on record in support of the United Nations' effort to adopt a new set of "Sustainable Development Goals (SDGs)" now that the "Millennium Development Goals (MDGs)" are about to expire.[11] Pope Francis is expected to attend the UN meeting in September where the SDGs will be discussed and enacted.

The report also includes exhortations that echo previous Vatican statements on environmental responsibility, but this time it focused on the urgent need for comprehensive policies meant to establish a "zero-carbon" based economy as soon as possible. Given the nature of the change envisioned, it is not surprising that the statement calls for the mobilization of religious institutions in support of what will amount to a "moral revolution." The statement concludes with a clear exposition of the scientific consensus that has shaped and to some extent been shaped by the work of the Pontifical Academy of the Sciences on climate change. Among other things, the report notes the unprecedented rate at which carbon dioxide emissions have increased relatively recently:

> Over the course of a relatively short time, the concentration of carbon dioxide, CO2, has increased by 40%, and now exceeds the highest levels in at least the last million years. Carbon dioxide is a major driver of the natural

> climate as well as biotic processes in both terrestrial and marine ecosystems, making possible life on Earth. The problem we now face is that fossil fuel combustion and deforestation have significantly altered the carbon balance of the atmosphere and the biosphere. (PAS/PASS, "Climate Change and the Common Good," 2015)

"The highest levels in at least the last million years…." What this means is actually measurable: "The climatic and ecological impacts of this human interference with the Earth System are expected to last for many thousands of years into the future. The planet has warmed by 0.85°C since the 1880s. Glaciers and Arctic sea ice have continued to shrink." To be sure, there are skeptics who believe that such warming is within the pattern of "alternating cold periods (ice ages or glacials) and warm periods (inter-glacials) during the past." Therefore, "today's climate and ice cover changes are entirely natural events." But the report accepts the science that refutes such a conclusion:

> The primary triggers for ice ages and inter-glacials are well understood to be changes in the astronomical parameters related to the motion of our planet within the solar system and to natural feedback processes in the climate system. The time scales between these triggers are in the range of 10,000 years or longer. By contrast, the human-induced changes observed in carbon dioxide, other greenhouse gases and soot particle concentrations are taking place on 10-100 year timescales – at least 100 times as fast. (PAS/PASS, "Climate Change and the Common Good," 2015)

Rather than complacency, these findings suggest that "the present release of global warming pollutants is occurring during an interglacial period when Earth is already at a natural temperature maximum." This should make us worry, since "a warming of the planet by more than 2°C during an interglacial would be unprecedented compared with what the planet and its ecosystems have experienced in the last 800,000 years." The report therefore concludes that "if current levels of increase in the emission of carbon dioxide and other warming pollutants continue unabated, the increase in mean global temperature could reach 2°C by mid-century and could be more than 4°C beyond 2100." This is why "Climate Change and the Common Good" insists on the urgency of decisive action now:

> Generations to come will experience and will likely suffer from the environmental consequences of the fossil fuel consumption of the last two centuries. They are likely to wonder what took 21st century citizens of the world so long to respond to these frightening climate trends. The problem is not one of how well our children and grandchildren will fare in the world of the future, but whether civilization as we know it can be extended beyond the next 100 years. (PAS/PASS, "Climate Change and the Common Good," 2015)

In light of such dire forecasts, if and when they begin to make a difference in public opinion, the major challenge may be finding a basis for overcoming the feeling that all is already lost. The report, therefore, walks a fine line between hope and despair, insisting on the one hand that "fortunately, there is still time to mitigate climate change significantly and avert catastrophic

consequences for society and ecosystems," while also warning that pledges to phase out fossil fuel by the end of the century simply may be too little too late:

> By any measure, the projected changes for 2100 and beyond should be viewed by a rational society as being large enough to take the necessary steps immediately to sustainable and clean energy. The world must achieve deep de-carbonization of the energy system by mid-century, and reach near-zero carbon emissions by around 2070 if the rise in mean global temperature is to be below the 2°C upper limit.

One can only hope that Pope Francis is successful in his efforts to rally public opinion globally in the direction of taking climate change seriously. What he may have to say, in the event that the meetings at the UN in September and the international governmental conference scheduled for Paris in November fail to produce the commitments needed, can only be a matter for speculation. But no matter what happens, we know that he will be quick reassure everyone that God has not abandoned us. Not now. Not ever.

A Test Of Global Leadership Skills

In November 2014, USA President Barack Obama and China President Xi Jinping concluded a "landmark agreement" in Beijing committing their nations to drastic cuts in carbon emissions that would have China cap its output of greenhouse gases by 2030 or earlier if possible, while the USA will cut its emissions to 26-28% below 2005 levels by 2025 (Taylor,

2014, The Guardian). China also promised to increase its use of energy from zero-emission sources to 20% by 2030. This comes in the wake of an agreement within the European Union, which endorsed a binding 40% greenhouse gas emissions reduction target by 2030. Like Pope Francis, Presidents Obama and Xi are especially concerned about the Paris negotiations scheduled for November 2015, and hope this pledge between the world's two greatest producers of greenhouse gases will enable all nations to recognize the seriousness of the problem, and the urgent need for concerted action.

In light of China's previous change of policies after the Songhua River disaster, its efforts to take its rightful place as a leader among nations seeking to mitigate global warming should come as no surprise. As dramatic as the announcement at the China-USA summit in November 2014 may have been to some, it is but another step in China's striving to demonstrate its concern for environmental protection. Here are some of the particulars regarding actions already taken or pledges already made in China with regard to its own environmental problems:

- "In December 2013, China's National Development and Reform Commission, the country's top economic planning agency, issued its first nationwide blueprint for climate change, outlining an extensive list of objectives to achieve by 2020. Since January 2014, the central government has required 15,000 factories, including large state-owned enterprises, to publicly report real-time figures on their air emissions and water discharges. And the government has pledged to spend $275 billion over the next five years to clean up the air. More recently, China's legislature

amended the country's environmental protection law to allow for stricter punishments against companies or individuals caught polluting the environment. China is also one of the biggest investors in renewables; its spending could total 1.8 trillion RMB ($300 billion) in the five years through 2015 as part of its pledge to cut its carbon intensity. According to its National Energy Administration, renewable energy sources comprised 57 percent of newly installed electricity-generating capacity in the first ten months of 2013." (Xu, 2014 (MP))

- Of particular concern is the status of coal-fired plants, since according to Zhang Wancai, deputy director of the Beijing Development and Reform Commission's Energy Bureau, "22 percent of air pollutants are from coal consumption." Zhang, however, claims that "By the end of 2015, we will reduce coal consumption by 8 million tons, adding that a reduction of 7.1 million tons has already been achieved….By 2017, Beijing will have all its power generated by clean-energy gas, and coal consumption will be cut by 9.2 million tons annually - the equivalent amount used for the four coal-burning thermal power plants." (MEP, 2015 (MP))
- The new policies of the central government suggest that certain lessons about transparency and accountability have been learned from the Songhua River disaster, and that the government is now becoming proactive in addressing the severe water pollution problems throughout China, even in the absence of additional crises. Not only is the ground-water so polluted as to make drinking it a health hazard, but the over-extraction of groundwater is creating a host

of problems with far-reaching consequences for both urban and rural Chinese communities: "Groundwater depletion not only contributes to the drying up of lakes and wetlands but increases salinity of groundwater supplies. Furthermore, over-extraction gives rise to subsidence, which causes damage to infrastructure as well as reduces aquifer storage capacity." In order to address the problems, China has mandated a new Water Ten Plan that sets out the following actions:

- "Control Groundwater over-extraction including water embedded in shale;
- "Extraction of geo-thermal water & mineral water will require mining permit;
- "Over-extracted groundwater areas to be drawn by 2017; Beijing, Tianjin, Hebei, Yangtze River Delta & Pearl River Delta to have a shorter deadline of 2016; and
- "No new industrial use of groundwater is allowed in over-extracted groundwater areas in the North China Plain." (Hu, 2014 (MP))

As one observer commented: "Regulations on groundwater will be tightened. The Water Ten Plan aims to revise the standard of groundwater quality; moreover, there are plans to revise standards of pollutant discharge for urban wastewater, sludge and agriculture runoff. Although no specific deadline is given, we expect the revision will probably come soon given groundwater's current dire situation." (Hu, 2014 (MP))

While China's response to its compound environmental crises is encouraging, many observers fear that it is insufficient; another case of too little too late. A recent McKinsey report commented that "China's leaders say they recognize the challenge at hand" and quoted a 2011 statement by Environment Minister Zhou Shengxian, who admitted that the "depletion, deterioration and exhaustion of resources and the worsening ecological environment have become bottlenecks and grave impediments to the nation's economic and social development." The McKinsey report continues: "Leaders are well aware that the state of the environment is a leading cause of social unrest, as well as one of the most important contributors to a range of public-health issues ranging from respiratory disease to cancer and developmental delays and deficiencies. And it hurts the economy: a study by the Chinese Academy for Environmental Planning (CAEP) estimated the cost of pollution spills, deteriorating soil, vanishing wetlands and other environmental issues at 3.9 percent of Chinese GDP in 2008." In response to these challenges, the government's response still seems anemic, since its "investment in environmental protection continues to hover around 1.3 percent of GDP" with approximately half that money "lost through local corruption or the allocation of environmental funds to non-environment related projects." (Economy, 2013 (MP))

The effort required to make significant gains in mitigating both air and water pollution, in China as elsewhere around the world, will require more than just a pragmatic calculation of the costs of business-as-usual, or the benefits of policies that will not challenge business-as-usual. The calculations and warnings of pending disasters have never yet been sufficient to change the minds and hearts of those whose livelihoods depend on

maintaining the status-quo. China, like the rest of the world, is in desperate need of a change of heart about the relationship between heaven, earth and humanity, similar to what CST has been advocating in its turn toward "integral human development." Among the many developmental deficits humanity is facing, the most serious may be the deficit in moral and spiritual education. Pope Francis, for one, has already reached out to leaders of all major religious traditions and to the political leaders around the world. It is to be hoped that when he meets with Presidents Obama and Xi and their colleagues during the Paris negotiations this November, they will find him — and the tradition of CST that he represents — a useful ally in our common struggle to secure a future for humanity on this planet.

References

[1] Cite specifics from Mark's research.

[2] Cite specific protocols and agreements.

[3] The Constitution of the Peoples Republic of China (1982), in Article 36, guarantees "freedom of religious belief": "No state organ, public organization or individual may compel citizens to believe in, or not to believe in, any religion; nor may they discriminate against citizens who believe in, or do not believe in, any religion." Article 36 clarifies the meaning this guarantee. While "the state protects normal religious activities, no one may make use of religion to engage in activities that disrupt public order, impair the health of citizens or interfere with the educational system of the state. Religious bodies and religious affairs are not subject to any foreign domination" (The Peoples Daily, 1982). In order to make sure these conditions are observed, the State Administration of Religious Affairs recognizes China's five officially sanctioned religious organizations that are in compliance with them, namely, the Buddhist Association of China, Chinese Taoist Association, Islamic Association of China, Three-Self Patriotic Movement and Chinese Patriotic Catholic Association. Of course, unregistered religious groups, for example, house churches, Falun Gong, Tibetan Buddhists, underground Catholics and Uyghur Muslims are liable to prosecution for illegal activities. Religious and moral education conducted under the auspices of the registered religious groups is an ongoing activity that receives State support, including assistance through various registered NGOs for the publication of Bibles, hymnals, and other manuals of religious instruction.

[4] The Songhua River Basin is located in northeast China. It has a drainage area of 556,800 square kilometers and is essential for the irrigation and transport of agricultural products. The Songhua River flows through Heilongjiang Province, Inner Mongolia and three regions of Jilin Province, supplying drinking water to several million people between Jilin and Harbin (Heilongjiang People's Government, 2007). The Songhua River merges with the Heilong River, which flows into Russia. Once in Russia it is known as the Amur River marking the border between the two countries. As a strategic shipping and transportation route, the Songhua's banks are home to many factories. The CNPC, who owned the plant where the explosion occurred, was just one of the firms stationed close to the Songhua River.

[5] A 2011 report from Zhou Shengxian, the Minister of Environmental Protection, "Investigations on the Progress in Rehabilitation of Songhua River," demonstrates the ways in which the MEP, following up on the instructions of the State Council, has intensified its efforts to coordinate policies and priorities among the provinces most directly impacted by the Songhua disaster. The statistics on measured reductions in the discharge of pollutants, plus the implementation of a new concept for rehabilitating the river, as specifically demanded by China's 11th Five Year Plan (2006-2011), are very impressive, as is the MEP's pledge to honor certain "basic principles" in the rehabilitation project, including "giving priority to people, improving people's life, obeying the rule of nature, revitalizing the river, adopting systematic management and integrated treatment approaches, and controlling the pollution sources and intercepting the wastewater, and optimizing the industrial mix" (Zhou, 2011). The progress reported by Zhou is confirmed by outside monitoring agencies, for example, the World Bank's 2007 Report on "Water Pollution Emergencies in China: Prevention and Response," which made ten specific recommendations for improving coordinated responses to emergency situations, particularly in the areas of (1) overall institutional reform, (2) risk management and prevention, and (3) response and mitigation, which have helped to guide the implementation of the MEP's efforts (World Bank, 2007). Similarly, the Asian Development Bank's 2012 Monitoring Report on the "Songhua River Basin Water Pollution Control and Management Project, Jilin Component" gives a detailed account of how the ADB's loan was used to develop infrastructure to assist in the long-term rehabilitation of the river (*WASHnews*, 2010).

[6] Here, the practical utility of the Principle of Subsidiarity may be understood through a comparison with Confucian teaching regarding the self, the family, and the State. (Quote Confucian Classics text.) The analogy in China favors the assumption that the Emperor's—or, if you will, the State's—authority is an extension of parental authority, with the expectation that filial piety (xiao) should be cultivated at all levels, that is, that harmony is achieved through the subordination of the lower to the higher authority. The Chinese model, however, lacks resources for qualifying or restricting the higher authority either of parents or Emperors, since it does not anticipate the subsidiary role of various civic institutions, private and public, in providing assistance to both

families and the State. While both CST and Confucian social philosophy seek the achievement of social harmony, the means for realizing this goal appear far morediverse—and therefore potentially more effective—that those offered in the Chinese model.

[7] Among the most prophetic of these precursor statements is Pope Paul VI's description of the coming environmental crisis, listed among the "new social problems" to be addressed on the 80th anniversary of *Rerum Novarum*: "While the horizon of man is thus being modified according to the images that are chosen for him, another transformation is making itself felt, one which is the dramatic and unexpected consequence of human activity. Man is suddenly becoming aware that by an ill-considered exploitation of nature he risks destroying it and becoming in his turn the victim of this degradation. Not only is the material environment becoming a permanent menace - pollution and refuse, new illness and absolute destructive capacity - but the human framework is no longer under man's control, thus creating an environment for tomorrow which may well be intolerable. This is a wide-ranging social problem which concerns the entire human family." (*Octagesima Adveniens*, 1971, paragraph 21).

[8] If there is no conflict in principle between faith and reason, then there is also no justification for any wholesale repudiation of the advances in technology that have enabled us both to create an environmental crisis and also to resolve it responsibly. Though the Church has condemned the use of certain reproductive technologies as immoral, it has done so not because of any animus against technology but because of specific ways in which technology has been used in what it considers morally irresponsible ways. Here is what *Caritas in Veritate* teaches about technology: "Technology enables us to exercise dominion over matter, to reduce risks, to save labour, to improve our conditions of life. It touches the heart of the vocation of human labour: in technology, seen as the product of his genius, man recognizes himself and forges his own humanity. Technology is the objective side of human action whose origin and *raison d'etre* is found in the subjective element: the worker himself. For this reason, technology is never merely technology. It reveals man and his aspirations towards development, it expresses the inner tension that impels him gradually to overcome material limitations. *Technology, in this sense, is a response to God's command to till and to keep the land* (cf. Gen 2:15) that he has entrusted to humanity, and it must serve to reinforce the covenant between human beings and the environment, a covenant that should mirror God's creative love. (*Caritas in Veritate*, 2009, paragraph 69)

[9] World Bank report on the likely consequences of a 4°C increase in temperatures. Turn Down the Heat: Why a 4°C warmer world must be avoided. Schellnhuber et al, 2013. Published by the World Bank.

[10] The Vatican's statement is also very blunt about the inequities in global distribution of resources, and thus the different responsibilities of the rich and the poor in mitigating climate change: "In the 21st century world it is, again, the rich who are doing most of the greenhouse polluting, but the rich now are no longer confined to the rich world. The three billion poorest people continue to have only a minimal role in the global

warming pollution, yet are certain to suffer the worst consequences of unabated climate change" (PAS/PASS, "Climate Change and the Common Good," 2015). Meanwhile, as we write, the leaders of the G7, meeting in Garmisch-Partenkirchen, Germany, have pledged to phase out fossil fuel use by the end of this century. Environmental groups, however, at most are cautiously optimistic, given the lack of progress in achieving compliance with previous pledges. "Reacting to the summit's final communique, the European Climate Foundation," for example, "described the G7 leaders' announcement as historic, saying it signalled 'the end of the fossil fuel age' and was an 'important milestone on the road to a new climate deal in Paris'. (K. Connolly, 8 June 2015: "G7 leaders agree to phase out fossil fuel use by end of century," *The Guardian*: http://www.theguardian.com/world/2015/jun/08/g7-leaders-agree-phase-out-fossil-fuel-use-end-of-century.

[11] The Sustainable Development Goals at this moment are still a work in progress. The current proposal calls for 17 goals (more than double the number listed in the MDG statement). Among other new goals, the list contains several references to the environmental crisis, and calls for serious coordinated measures to mitigate it while also addressing the ongoing problems of global poverty and uneven development. Here is what the report of the Open Working Group charged with finalizing the proposal for consideration at the United Nations' meeting in September, has to say about climate change: "8. The OWG underscored that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions. It recalled that the United Nations Framework Convention on Climate Change provides that parties should protect the climate system for the benefit of present and future generations of humankind on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. It noted with grave concern the significant gap between the aggregate effect of mitigation pledges by parties in terms of global annual emissions of greenhouse gases by 2020 and aggregate emission pathways consistent with having a likely chance of holding the increase in global average temperature below 2° C, or 1.5° C above pre-industrial levels and it reaffirmed that the ultimate objective under the UNFCCC is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." ("OWG Proposal for Sustainable Development Goals," 2015 (https://sustainabledevelopment.un.org/sdgsproposal).

[12] According to a report released in 2014 by China's Ministry of Environmental Protection (MEP), "China's underground water quality keeps falling with over 60 percent of monitored areas suffering "very poor" or "relatively poor" quality last year. The Ministry of Land and Resources monitored water quality at 4,896 spots in 202 cities across the country in 2014.Underground water quality was ranked "relatively poor" in 45.4 percent of spots and "very poor" in another 16.1 percent last year, according to the ministry's annual findings. According to China's underground water standards, water of relatively poor quality can only be used for drinking after proper treatment. Water of very poor

quality cannot be used as source of drinking water at all. The result means 61.5 percent of underground water could not be directly drunk last year, up from 59.6 percent in 2013 and 57.4 percent in 2012." (MEP, 2014 (MP))

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Climate Change, Moral Degradation, and the Islamic Solution.

Doddy S. Sukadri and Insan Kamil Al Batanji

Introduction

Discussions on global warming and climate change have been debated globally by people from all walks of life -- from presidents to laborers, politicians to civic communities, world-famous scientists to convsumers. Many scientists such as climatologists have concluded that climate change is unavoidable. The increase in global temperatures has resulted in the melting of ice in the North and South poles, bringing about a rise in sea level and threatening small islands as well as human, animal and plant communities along coastal areas. Climate change has also had a negative impact on biodiversity, agriculture, health, marine life, the fishing sector, etc.

Indonesia, being the world's biggest archipelago with more than 13,000 islands, has especially been impacted by climate change. This is particularly true in the agriculture and health sectors. Uncertain whether patterns, droughts, floods and landslides have resulted in crop failure and food insecurity. Climate change has also resulted in a rise in little-known tropical deseases, including skin deseases, and an increase in bugs such as dengue- and malaria-bearing mosquitos.

Long droughts have also brought about an increase in forest and land fires in Sumatera and Kalimantan. The resultant haze has

had an adverse effect on visibility, endangering air transportation, as well as causing lung diseases.[1]

The relationship between global warming and climate change is not well understood. Many people are of the view that global warming is caused by climate change, and climate change is a result of human activities and natural disasters. The later is correct, but the former is incorrect. Human activity in fact causes global warming, which gradually results in climate change. The effects of climate change are such things as drought, flooding, soil and land erosion, diseases and sea level rise.

The Intergovernmental Panel on Climate Change (IPCC), a group of 1,300 independent scientific experts from countries all over the world, concluded that 95 percent of the causes of global warming are human activities that produce GHG emissions. This is called *'anthropogenic emission.'* This recent figure for anthropogenic emission is the highest to date given by the UN body. In 2007, 2001 and 1995, the figure was 90 percent , 66 percent and 50 percent respectively.

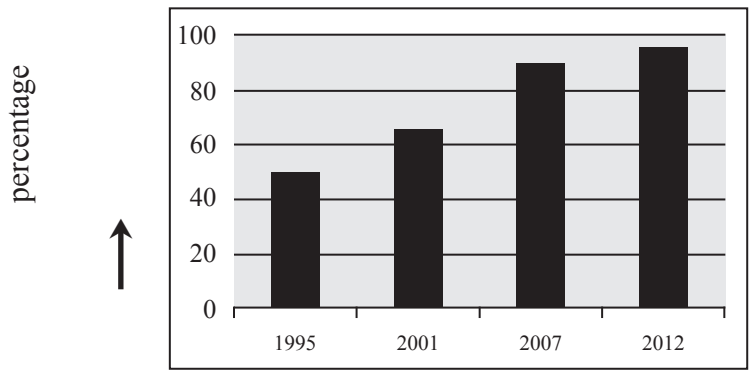

Figure 1. Percentage of emissions from human-induced activities is increasing over time. Source: IPCC (2014)

The scientists are in agreement that the main cause of the current global warming is expansion of the "greenhouse effect" — warming that occurs when the atmosphere traps heat radiating from the earth toward the space. Over the last century, the burning of fossil fuels such as coal and oil has resulted in the increasing concentration of carbon dioxide (CO_2) in the atmosphere. This happens because the carbon that results in the burning process combines with oxygen in the air to make CO_2. To a lesser extent, economic development including clearing of forestland for agriculture, industries, transportation, and other human activities have increased concentrations of greenhouse gases (GHG).

Undoubtly, scientists are of the view that human activities are the biggest cause of global warming. From an ethical perspective, cultural issues, human habits, and consumption patterns contribute significantly to global warming. The more GHG are released to the atmosphere, the higher the air temperature becomes because the atmospheric layer becomes thicker. It is just like someone sleeping with a thick blanket without air-condition in the room. The thicker the blanket, the hotter she or he feels. Scientists believe that 450 part per million (ppm) of GHG concentration in the atmosphere is the threshold for humans and other living organisms to live in balance on earth. A figure higher than this would trigger a negative impact to life, including human life.

From an Islamic perspective, nothing happens in this world by accident. Everything that happens is due to *Sunatullah* - natural pattern set by Allah, which means Allah, the God Almighty and Creator, has set everything that happens on earth by its provisions. According to *Sunatullah*, Allah makes things happen in two

distinct ends; the good and the bad. Life is a choice, and humans have been given the choice to do good or bad according to their senses. Allah grants the carnality to humans for doing the bad things, and lust for the good things. For example, hunger takes place because of human lust to keep alive, but stealing happens due to carnality. Both lust and carnality are called *Sunatullah*.

The increase in population and resultant increase in the demand for goods and services is also due to *Sunatullah*. This demand is met by the application of science and technology that does not take energy efficiency into account. Our challenge is how to apply science and technology to respond to the increasing demand for energy and at the same time mitigate GHG emissions, as well as apply green technology through low emission development strategies.

The Industrial Revolution that took place in the 18th century was the result of scientific and technological innovations that required the consumption of large amounts of fossil fuels. Increases in population, technologies and GDPs are factors that increase CO_2 emissions. Nevertheless, human behavior and greediness are the main drivers of the emissions. In forestry sector, for example, deforestation and forest degradation are due to the overuse of forest resources and greediness of people who have no concern for the needs of future generations. Likewise, modern machineries requiring high quantities of fossil fuels are developed from scientific and technological developments. All of these conveniences are made available to and produced by men. But they depend heavily on fossil fuels, resulting in the increase of CO_2 emission. In addition, air pollution due to haze from mills and vehicles, excessive use of electricity and

agricultural fertilizers, and many other human activities contribute to the CO_2 concentration in the atmosphere. In Indonesia, forestry and land use change presently is the largest contributor to the national CO_2 emission, while the energy and transportation sectors are the second largest contributor. In short, the global warming phenomenon is the result of human activities, or in other words, humans are suffering from what they have done themselves.

Moral Degradation - the Main Cause of Global Warming

Muslim scientists, in particular, have not paid sufficient attention to managing science in accordance with the Islamic path and principles. Islam teaches us how to manage science and technology proportionally, use energy wisely, and keep the environment sound. However, moral degradation and avarice have made them forget Allah. Disobedience to Allah, moral hazards, and worldly ambitions have brought about Muslims to disobey Islamic principles. As a result, much of scientific and technological innovations have been used merely for carnal desires.

Muslims believe that what is happening on earth today and things that will be taking place in the future have been explained 14 centuries ago during the era of Prophet Muhammad, Peace be upon Him. Through the Qur'an and Hadith of Prophet Muhammad, all of the disasters and disturbances had long been discussed. Both the Qur'an and Hadith point out that the destruction of the earth is due to excessive desires of men in taking wealth and profit, and forgetting the existence of Allah, the most Gracious and Merciful. In their arrogance, they thought

that what they get is not due to the gift of Allah, but because of their scientific findings. Allah has explained this issue through His word:

> *"Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so He may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness]"* (:Qur'an 30; 41).

As time goes by, damage on moral, religion, belief and worship of Allah, coupled with other immoral practices, seems to be legalized. All of these things have angered Allah, which is reflected in natural disasters. Many of us may not agree and believe that natural calamities have any connection whatsoever with moral degradation. As such, scientists are working to find solutions by making predictions on the basis of assumptions and limited information and knowledge. Islam, on the other hand, offers a more comprehensive way to confronting global warming. Islam concludes that immorality has resulted in natural disturbances and triggered catastrophes all over the world. This is the law of cause and effect. The following Hadith clearly signals the occurance of a catastroph in connection to immorality. From Imron bin Husain, the Prophet Muhammad stated:

> *(Catastrophes) will be happening in the forms sinking, genetic mutation, and falling star. And so a Muslim asked the Prophet Muhammad: "O ye Muhammad ... when this tragedy is going to take place"? And Muhammad replied: "When musics are in place, artists are present, and alcoholic drinks are served"*
> (Tirmidhi)

The natural calamities that can be seen today are symptoms of natural degradation. Frequent occurrence of the symptoms has been seen globally. For instance, heavy rains end up with big flooding. Why does rain, a generous gift from Allah, become a catastrophe in many places? One of the answers is that there is excessive logging resulting in forests no longer having the capacity to absorb and contain rainwater in the soil. Illegal loggers are categorized by Allah as a hypocritical group of people. The following verse in the Qur'an signals that logging practices result in devastation because of disobedience in conserving natural resources.

> *And of the people is he whose speech pleases you in worldly life, and he calls Allah to witness as to what is in his heart, yet he is the fiercest of opponents. And when he goes away, he strives throughout the land to cause corruption therein and destroy crops and animals. And Allah does not like corruption.* (Qur'an 2:204-205).

Islamic Solution - Back to Allah

On the discussion of solutions, many are of the view that global warming cannot be solved by mitigative actions from individual countries alone, but it requires a global effort. Through IPCC, scientists have already recommended ways and means to tackle this issue, but unfortunately the result has not been significant yet. Countries continue to produce CO_2 emissions that are increasing the global temperature at an alarming rate. Islam, however,has offered a comprehensive solution to this more than 14 centuries ago. Allah, the God Almighty, through His Prophet Muhammad, Peace be upon Him, has invited people to come back to the right

path of Islam guided by the Qur'an and Hadith. According to the Qur'an, Allah created human beings and other living creatures to worship Him, to fix their broken faith, and to get rid of infidelity and immorality, as signaled in the holy Qur'an:

> *"Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so He may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness]"* (Qur'an 30 : 41).

If a city, country, or the world community seeks the answer to the question of life in Allah and the Prophet with faith and devotion, then one should wait for the promises of Allah. He promised blessings for His worshipers. Rain will fall as a blessing so that vegetation may flourish, and not as a disaster as seen in flooding.

This solution is not a human creation but undoubtedly divine. Humans have to apply it in their lives, so that the findings of science help solve the problem rather than destroy nature. Alignment between technology and the values of worship of Allah opens a space for people to preserve nature.

We need to pay attention to the warning of Allah, the Lord of heaven and earth, as like a siren signaling to us not to break the laws and limits of nature. History has taught us about the crimes of men and the punishment metted out by Allah. In the Qur'an it is mentioned that catastrophes are due to human disobedience. Natural disasters are certainly not a coincidence but they are God's warning for human violations.

> *"It is He who made the earth tame for you - so walk among its slopes and eat of His provision - and to Him is the resurrection. Do you feel secure that He who [holds authority] in the heaven would not cause the earth to swallow you and suddenly it would sway? Or do you feel secure that He who [holds authority] in the heaven would not send against you a storm of stones? Then you would know how [severe] was My warning. And already had those before them denied, and how [terrible] was My reproach"*(Qur'an 67 : 15-18).

The Meaning of Caliph - Khalifatullah on Earth

We need to also look at the role of Khalifah on earth. In the holy book of Islam, the designation of Khalifah is a sacred one for mankind, from one generation to the next. But the caliph also means controlling the passions of themselves and their families, and the effects of these on the environment. The mandate of the Khalifah is to master the earth, to prosper and to manage mankind[2].

> *And it is He who has made you successors upon the earth and has raised some of you above others in degrees [of rank] that He may try you through what He has given you. Indeed, your Lord is swift in penalty; but indeed, He is Forgiving and Merciful.* (Qur'an 6 : 156)

Perhaps many are asking why humans are appointed to be the Khalifah instead of other creatures. It is because humans have been selected by Allah. There had been other God's creatures that failed to manage the earth before. They stuck to destructive

behavior, so this task was transferred to humans. Where God declares "Remember when your Lord said to the angels: "I am going to make a vicegerent on earth. " This makes the angels draw conclusions and asked Allah, "Why do you want to make (Khalifah) on the earth, people who will make mischief there and shed blood, while we always glorify the praise you and purify you?" Allah said: "Behold, I know what you do not know" (Qur'an 2 : 30).

As such, the undertaking to manage the earth falls on humans. In this context, the management methods must comply with the ethics Allah revealed, because He is the only one who has created the earth and the Khalifah. This is logical, where irregularity must follow the legality and ethicality of the maker. Law and ethics are closely associated with human civilization. The Qur'an was revealed as the most effective law and ethics for the management of nature, conservation and human civilization. Why? Because the substance of the Qur'an is universal, covering all aspects of life and human livelihood. Muslims also believe that the substance and the values of the Qur'an is *akhlaqulkarimah* - revealed by Allah the Almighty, not theoretical engineering made by humans.

In connection with nature, humans also have to fulfill ethical principles. Ethics does not pertain only to Allah and other human beings, but also to nature. Herein lies the uniqueness of the Qur'an, which provides appropriate solutions to all human intentions. On the need for conservation of nature, the Qur'an has provided direction long before humans were afflicted. Note the Qur'an as follows:

> *"And cause not corruption upon the earth after its reformation. And invoke Him in fear and aspiration. Indeed, the mercy of Allah is near to the doers of good. And it is He who sends the winds as good tidings before His mercy until, when they have carried heavy rainclouds, We drive them to a dead land and We send down rain therein and bring forth thereby [some] of all the fruits. Thus will We bring forth the dead; perhaps you may be reminded. And the good land - its vegetation emerges by permission of its Lord; but that which is bad - nothing emerges except sparsely, with difficulty. Thus do We diversify the signs for a people who are grateful.* (Qur'an 7 : 56-58).

Note the Qur'anic morality regarding actions against nature: "Do not do mischief on the earth after Allah has fixed it, and call upon Him with fear and hope." This verse bans adverse human behavior on nature. Subsequently, people are prohibited to do activities that damage living creatures, though in the context of scientific and technological research, we may be allowed to do so. Utilizing nature for one's ambitions is strickly prohibited. For example, logging is carried out illegally to meet the desires of man, resulting in devastation of forests. Likewise, wasteful use of refrigerators and air-conditioners that consume excessive electrical power exhausts fossil fuels. These kinds of activities are very closely related to human ambitions that sacrifice the balance in nature and neglect the needs of future generations.

These activities are categorized as morally destructive to nature. The element of damage is obviously not the morality of

the Qur'an. Therefore, human consciousness is needed to get back to the primary purpose of Allah in creating the human, which is nothing more than to worship Allah and to become Khalifah. Worship of Allah and carrying out the mandate of the Khalifah are already enshrined in the Qur'an and Hadith of the Prophet Muhammad, Pease be Upon Him. It depends on the way humans want to implement it properly.

Human life that is filled with worshipping Allah will bring about reward, grace and help of God. The essence of worship is not just rituals but also concrete actions. These include management of nature. When done according to the methods of the Qur'an, it is considered worship. This means that the development of science and technology that is according to the teachings of Islam is considered a predicate to Islamic science. An example of an Islamic scientist is Ibn Sina, the father of modern medicine who was also an astronomer and philosopher. He did not use his scientific capabilities for worldly ambitions. Other examples are: Al Haytham, a mathematician who was an expert in geometry and inventor of the camera; Al Jazari, an engineer who was a forerunner in developing robotics; Al Khazini, a versatile Muslim scientist in the fields of physics, chemistry, astronomy, biology, mathematics and philosophy; and Al Hayyan, a physicist, medical doctor, mechanic and other scientific disciplines[3].

Conclusion

If all of man including scientists and researchers play their roles in accordance with Qur'anic ethics, their activities can be controlled properly. In that sense, their activities and scientific

findings will no longer bring about degradation to the earth and the environment. The Qur'an has clearly explained the balance and harmony for humans and all of Allah's creatures. It is a hallmark of faith and devotion to the morality of the Qur'an for Muslims and all mankind in general. Observe the following verse:

> *"And if only the people of the cities had believed and feared Allah, We would have opened upon them blessings from the heaven and the earth; but they denied [the messengers], so We seized them for what they were earning"*(Qur'an 7: 96).

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[1] Excerpted from *Silontong.comand* DW AKADEMIE web site, Skeptical Science, *Pintar Biologi* (Smart Biology) and other articles.

[2] *Tafsir Al- Tabari (Qur'an 6: 165)*

[3] *"Ilmuan yang Terlupakan"* (The Forgotten Scientist) in Kompas.com.

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The global ecological crisis is affecting all dimensions of life and living. The spread of a consumerist approach to life is contributing to the current devastation of the environment, as exhibited in the human attitude and lifestyle of over-consumption.

The present ecological predicament requires balancing a market-responsive economy with the principle of moral capitalism and cultural and religious resources. We need to revisit issues of how biodiversity and ecosystems have shaped human consciousness and behavior, and what contributions can religions, governmental departments, educational institutions and the business sector can make in constructing a new understanding about existence in terms of human-ecology relations for sustaining the cosmos.

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