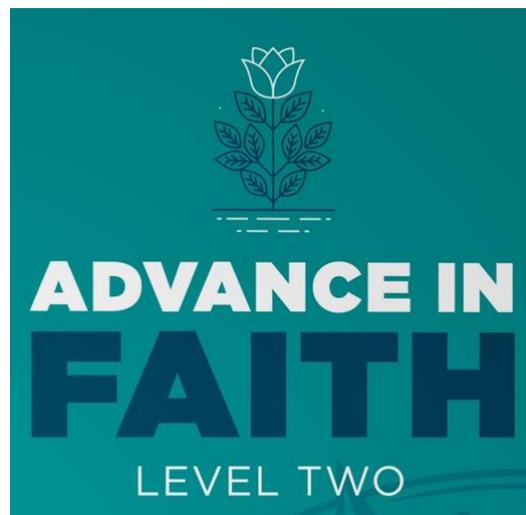


Earth Matters:

Christian Faith and the Future of the Planet

Week 2

A Planet in Peril



Introduction

Is the world *really* facing an environmental crisis? Are the stakes as high as we are sometimes led to believe they are? And what about ‘the science’ – is it really reliable? In our twenty-first century media-driven culture we are bombarded every day with conflicting messages about what is and isn’t going on in the world and sometimes it’s hard to make sense of it all. What exactly are the issues?

The purpose of this session is:

- *To discuss the scope and scale of the environmental crisis facing the earth;*
- *To explore the potential long-term impact of these challenges on this and future generations.*

Planet in Peril: The extent of the ecological crisis

"We know that the whole creation has been groaning as in the pains of childbirth right up to the present time." - Romans 8:22

Many scientists today argue that our planet faces the possibility of a devastating environmental crisis brought about by the growing demands of its ever-increasing and already enormous human population. Even though primeval history provides us with evidence that not all environmental / climate anomalies have anthropogenic roots¹, a large part of the current environmental concern is believed to be due to the size of the global population.

Currently, the world’s population is estimated to be over 7.5 billion and in line with population projections, this figure will continue to grow at rates that were unprecedented before the 20th century, even though the rate of increase has almost halved since its peak of 2.2 percent per year, which was reached in 1963. On its current growth trajectory, the world’s population is expected to reach over 9 billion by the year 2050.

According to Worldwatch² President, Lester Brown, population growth is at the top of the list of seven key ‘environmental trends shaping the new century’. He believes that ‘the projected growth in population over the next half-century may more directly affect economic progress than any other single trend, exacerbating nearly all other environmental and social problems’³

As professors of religion and committed environmentalists, James Martin-Schramm and Robert Stivers (2003: 10-11)⁴ are more specific in their diagnosis adding that the primary factor driving

¹ Other causes include solar variations, orbital variations, plate tectonics and volcanism - IPCC. (2007) Climate change 2007: the physical science basis (summary for policy makers), IPCC.

² The Worldwatch Institute, founded in 1974, is an independent research organisation known around the world for its accessible, fact-based analysis of critical global issues. Worldwatch disseminates its work in more than 100 countries via the Internet and global news media with the current focus being Brazil, China, India, Europe, and the United States—the areas of the world that are pivotal to addressing the world’s environmental and social problems. For more on Worldwatch visit www.worldwatch.org.

³ Bouma-Prediger, S. 2001, *For the Beauty of the Earth: A Christian Vision of Creation Care* (Grand Rapids, MI: Baker Academic), pg. 41

⁴ Martin-Schramm, J.B. & Stivers, R. L. 2003, *Christian Environmental Ethics: A Case Method Approach* (Maryknoll, NY: Orbis Books), pg. 10-11

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population growth is no longer birth rate but 'demographic momentum'. They point out that although women around the world are giving birth to fewer children⁵, the age structure in nations has changed with more women now entering the prime years of their reproductive lives⁶. They go on to say that not only is population size and structure a determining factor and therefore cause for concern but so too is population *concentration*, with more and more people migrating from rural areas to urban centres in search of prosperity. Population growth cannot be adequately considered without reference to the resource consumption levels of individual nations and the fact that wealthier countries tend to consume the most, despite having significantly smaller populations⁷.

They go on to say that in addition to prolific consumption, one must also consider the power and use of technology as a determining factor. Although writing almost two decades earlier, Christian author Wendell Berry proposed a similar view and included both consumption and technology in his assessment of probable cause:

*'I would argue that, at least for us in the United States, the conclusion that 'there are too many people' is premature, not because I know that there are not too many people, but because I do not think we are prepared to come to such a conclusion... The population problem, initially, should be examined as a problem not of quantity but of pattern... I would argue that it is not human fecundity that is overcrowding the world so much as the technological multipliers of the power of individual humans. The worst disease of the world now is the ideology of technological heroism, according to which more and more people willingly cause large-scale effects that they do not foresee and that they cannot control.'*⁸

Needless to say, there are others, including some within the scientific community, who do not support the idea of an environmental 'crisis'. Some have questioned the empirical research that suggests the earth is in or heading toward a crisis and have offered alternative theories, even going so far as to suggest that the environment is essentially indestructible. While many acknowledge changes in weather patterns they believe them to be natural and cyclical and therefore not a cause for concern.

Although the nature, causes, extent and long-term consequence of this impending or potential crisis will continue to be the subject of much debate, most environmental scientists from a wide range of disciplines including botany, microbiology, marine biology and meteorology, agree that the earth's life-supporting systems are being subjected to excessive amounts of *anthropogenic* pollution and degradation and that the effects of such degradation are harmful to both human and non-human life-forms.

A scientific assessment of the causes and extent of the crisis will, of necessity, be ongoing but several fundamental issues have already been identified as representing the essence of the problem:

⁵ Over the last 50 years the global fertility rate has dropped from an average of 6 children per woman to an average of 3.4.

⁶ For example, in sub-Saharan Africa over 45% of the population is under the age of 15.

⁷ For example, the United States has only 5% of the world's population but consumes 25% of the world's energy – for more on energy consumption ratios see <http://www.eia.doe.gov/>

⁸ Berry, W. *Home Economics* (New York, NY: North Point), pg. 149-150

1.1 Global Warming and Climate Change:

Global warming, resulting in unprecedented climate change, is believed by many environmental scientists to be the single greatest threat facing the planet. Despite its apparent priority, the concept is widely misunderstood. The term 'global warming' has incorrectly been used as a generic term to refer to the environmental crisis as a whole, even though just a slightly deeper level of understanding of the issue would reveal that the crisis consists of multiple concerns, each distinct and yet inter-related to the others.

Global Warming refers to the increase in the average temperature of the Earth's near-surface air and oceans since the mid-twentieth century and its projected continuation. According to The Intergovernmental Panel on Climate Change (IPCC)⁹ the average global air temperature near the Earth's surface increased at an average rate of 0.17 °C each decade since 1970 – more than twice rate observed for the entire period of recorded observations (1880-2015). The average global temperature for 2016 was 0.94 °C above the 20th century average of 13.9 °C. The IPCC has concluded that most of the observed increase in globally averaged temperatures since the mid-twentieth century was very likely due to the observed increase in industrial greenhouse gas concentrations. Other natural phenomena such as solar variation and volcanic activity probably had a small warming effect during pre-industrial times until 1950 and a small cooling effect from 1950 onward¹⁰.

Although not the only consequence, the primary effect of Global Warming is believed to be widespread climate change. It has been argued that an increase in global temperature will cause sea levels to rise by melting land-based ice caps at the poles, increase the intensity of extreme weather events such as hurricanes and change the amount and pattern of precipitation. Other potential effects of global warming include a reduction in agricultural yields, forced changes to trade routes, glacier retreat, species extinctions and increases in the ranges of diseases.

In response to the growing concern over Global Warming, most national governments have signed and ratified various agreements and protocols, aimed at reducing greenhouse gas emissions, but there is ongoing political and public debate worldwide regarding what, if any, action should be taken to reduce future warming or to adapt to its expected consequences.

The theory of Global Warming remains a controversial one as a number of scientific uncertainties persist. These include the cause of the warming phenomenon, the amount of warming expected in the future and how that warming and its related changes will vary from region to region around the globe.

Much of the current debate around Global Warming is related to the discovery of another phenomenon referred to as Global Dimming - the gradual reduction in the amount of direct irradiance at the Earth's surface that was observed for several decades after the start of systematic measurements in 1950s. The effect varies by location, but worldwide it has been estimated to be of the order of a 4% reduction over the three decades from 1960–1990. In addition to reducing evaporation and rainfall in some areas, it is argued that Global Dimming also created a cooling effect that may have partially masked, the effect of greenhouse gases on global warming. The full effects of both Global Warming and Global Dimming are yet to be conclusively determined.¹¹

⁹ For more IPCC perspective refer to www.ipcc.ch

¹⁰ These conclusions have been endorsed by at least thirty scientific societies and academies of science. While individual scientists have expressed disagreement with some findings of the IPCC, the overwhelming majority of scientists working on climate change agree with the IPCC's main conclusions.

¹¹ For more on Global Dimming see Stanhill, G and Cohen, S in *Agricultural and Forest Meteorology* Volume 107, Issue 4, 19 April 2001, Pages 255-278

1.2 Critical Ecological Imbalances:

Natural environments are ordered and self-regulated by ecological systems that hold the earth's essential elements in a delicate balance. Add too much of a particular element, be it water, sunlight, carbon-dioxide or nitrogen (or the by-products created by the use of these elements) and the system becomes stressed and over-loaded. Remove too much of a particular element and the environment is thrown into critical imbalance. Human beings, like the elements themselves, are an integral part of this finely tuned network of systems and we are uniquely capable of both adding to and taking away from the natural flow of elements within the earth's cycles and systems. Remove human beings and the earth will continue to regulate itself through these natural, cyclical systems but add human beings and their unique capacity to manipulate the environment and the delicate balances are placed at risk. This type of imbalance is most evident in the increased concentrations of industrial-based Carbon Dioxide in the atmosphere but that it can also be found in the form of pollution and waste. Any element added to or subtracted from the system will inevitably result in a degree of imbalance.

1.3 Pollution and Waste:

Pollution is defined as *'the introduction of contaminants into an environment, of whatever predetermined or agreed upon proportions, that causes instability, disorder, harm or discomfort to the physical systems or living organisms therein'*¹². Pollution can either be in the form of chemical substances or energy such as noise or light. Pollutants can be naturally occurring substances or energies but are considered to be contaminants when in excess of natural levels. Principal water and air pollution sources include coal-fired power plants, oil refineries, petrochemical plants, nuclear waste disposal activity, incinerators, large livestock farms, metals production factories, plastics factories, and other heavy industry. Some of the more common soil contaminants are chlorinated hydrocarbons (CFH), heavy metals (such as chromium, cadmium which is found in rechargeable batteries, and lead, found in lead paint), aviation fuel and petrol, zinc and benzene. Ordinary municipal landfills are also the source of many chemical substances entering the soil environment (and often the groundwater), emanating from the wide variety of refuse accepted, especially substances illegally discarded there. Noise pollution is little thought of when considering 'contaminants' but one is immediately struck by the relative quiet of a natural environment when compared to the excessively noisy cities and suburbs in which we live. Noise pollution adds to the psychological stresses and strains we endure as human beings confined to the walls of the 'concrete jungle'.

1.4 Resource Depletion:

Any given surface area of the earth will only be able to support a limited population. The kind and quality of resources within that particular area will determine the size of a sustainable population, both human and non-human. Ecologists refer to the dynamic equilibrium between a population and its resources as 'carrying capacity'. Understanding and applying the concept of 'carrying capacity' is essential to responsible management of the earth's natural resources. Currently there are large areas of the earth's land and sea that are being exploited and depleted in the name of commerce and industrialisation. The enormous demand, particularly among emerging markets in BRIC¹³ countries, for ocean-based food supplies, ferrous and non-ferrous metals and carbon fuels such as coal have resulted in large-scale fishing and mining operations that extract vast amounts of mineral and other resources on unsustainable levels. This has resulted in vast areas of natural habitat being diminished or degraded.

1.5 Habitat Destruction:

Habitat destruction can be understood in terms of habitat reduction, removal or change due to urban sprawl, infrastructure development, the conversion of land to agriculture and other human-induced changes to the characteristics of land that results in a reduction of the natural habitat's carrying capacity. When a habitat is destroyed and its carrying capacity affected, the plants,

¹² Online: <http://www.merriam-webster.com/dictionary/pollution>

¹³ BRIC is an acronym for the emerging market economies of Brazil, Russia, India and China

animals, and other organisms that occupy and depend on the habitat are at a greater risk of extinction. For instance, a common consequence of habitat destruction is 'islandisation', a phenomenon characterised by the fragmentation of habitats. As habitats are given over to development and agriculture, small isolated pockets of the original habitat remain but are separated from one another by the development. The species living within those small islands of original habitat tend to remain within those smaller contexts and consequently limit the gene pool from which future generations will emerge. This smaller gene pool results in weaker species, lower reproduction levels and, in some cases, the death of that species within that particular habitat. Habitat destruction need not be anthropogenic but much of the current environmental crisis is due to man-made industrial, agricultural and residential impositions on natural habitats, with little regard for the consequences.

1.6 Deforestation and Desertification:

In many countries, ongoing large-scale deforestation is reshaping geography and negatively affecting a variety of ecosystems. Deforestation is 'the conversion of forested areas to non-forest land for use such as arable land, pasture, urban use, logged area, or wasteland'. The removal or destruction of large portions of forest cover has resulted in a significantly degraded environment with reduced biodiversity. Desertification refers to the degradation of land in arid, semi-arid and dry sub-humid areas which occurs primarily as a result of human activity and usually arises from the demands of increased populations that settle on the land in order to grow crops and graze animals. Desertification is the result of several factors, primarily anthropogenic, including: overgrazing, over-cultivation, incorrect irrigation methods, deforestation, over-drafting of groundwater, increased soil salinity, and global climate change. As is the case with all forms of habitat destruction, the cause may not always lie with human beings, but the recent increase in deforestation and desertification have been scientifically linked to the increase in global population and the resulting rise in consumption. Africa, with its burgeoning population and ongoing civil unrest is the most at-risk continent with regard to deforestation and desertification. The primary concern with large scale deforestation and desertification is that it reduces the so called 'lungs of the earth' i.e. the vast tracts of green vegetation that are vital to the production of oxygen and the reduction of carbon dioxide.

1.7 Species Loss:

Another major concern, particularly for those who subscribe to the notion of rights for all living creatures, is species loss. In biology and ecology, extinction refers to the cessation of existence of a species or group of taxa, reducing biodiversity. The moment of extinction is generally considered to be the death of the last individual of that species (although the capacity to breed and recover may have been lost before this point). The fact that a species' potential range may be very large means that determining this particular moment is difficult and is usually done retrospectively. This difficulty leads to phenomena such as the so-called 'Lazarus taxa', where a species presumed to be extinct suddenly 're-appears' (typically in the fossil record) after a period of apparent absence. Apart from the ecological imbalances created by the demise of a species, humanity also suffers the loss of a sense of wonder and pleasure derived by observing and interacting with other creatures.

From the above it is clear that the environmental challenges of the twenty-first century are manifold and complex and that mankind has a central role to play both in creating and solving these ecological problems.

The Old Testament prophets often spoke about the relationship between people and the earth and the consequences that would befall them if they neglected to care for the land appropriately.

"I brought you into a plentiful land to eat its fruits and its good things. But when you entered you defiled my land and made my heritage an abomination." - Jeremiah 2:7

"How long will the land lie parched and the grass in every field be withered? Because those who live in it are wicked, the animals and birds have perished." - Jeremiah 12:4

"It will be made a wasteland, parched and desolate before me; the whole land will be laid waste because there is no one who cares." - Jeremiah 12:11

"There is no faithfulness, no love, no acknowledgment of God in the land. There is only cursing, lying and murder, stealing and adultery; they break all bounds, and bloodshed follows bloodshed. Because of this the land mourns, and all who live in it waste away; the beasts of the field and the birds of the air and the fish of the sea are dying." - Hosea 4:1-3

"Woe to you who add house to house and join field to field till no space is left and you live alone in the land. The LORD almighty has declared in my hearing: 'Surely the great houses will become desolate, the fine mansions left without occupants. A ten-acre vineyard will produce only a bath of wine, a homer of seed only an ephah of grain.'" - Isaiah 5:8-10

"The earth dries up and withers, the world languishes and withers, the heavens languish together with the earth. The earth lies polluted under its inhabitants; for they have transgressed laws, violated the statutes, broken the everlasting covenant. Therefore, a curse devours the earth; its inhabitants suffer for their guilt." - Isaiah 24:4-6

"The nations were angry; and your wrath has come. The time has come for judging the dead, and for rewarding your servants the prophets and your saints and those who reverence your name, both small and great and for destroying those who destroy the earth." - Revelation 11:18

Conclusion

Historically, the environmental concerns identified in this lesson have been directed towards those who operate within the domains of politics and law and have been championed by activist groups perceived to be on the radical left fringe of society. Not-for-profit organisations such as Greenpeace¹⁴ and The Sierra Club¹⁵ have become prominent leaders and advocates of socio-political reform aimed at protecting and preserving the environment.

In recent times however, the broader Christian church has added its voice to the many other faith-based and non-governmental organisations currently at the forefront of the fight against what many now call an 'ecological injustice'.

¹⁴ Greenpeace was founded in Vancouver, British Columbia, Canada in 1971 to protest the United States testing nuclear devices in Alaska. The focus of the organisation later turned to other environmental issues, and it has become widely known for its campaigns against whaling, bottom trawling, global warming, ancient forest destruction and genetic engineering. Greenpeace has national and regional offices in 28 countries, and a presence in 42 countries worldwide, all of which are affiliated to the Amsterdam-based Greenpeace International.

Online: <http://www.greenpeace.org/international/>

¹⁵ The Sierra Club is the oldest environmental organisation in America, founded on May 28, 1892 in San Francisco, California by the well-known preservationist John Muir, who became its first president. The Sierra Club has hundreds of thousands of members in chapters located throughout the United States and is affiliated with Sierra Club of Canada.

Online: <http://www.sierraclub.org/>

Reflection and Discussion Questions

1. Have you personally seen or felt the effects of man's destructive impact on the earth? If so, in what way? What effect did it have on you?
2. What do you think the long-term impact of these 7 aspects of the environmental crisis will be?
3. Is the sense of urgency presented by some justified? In your opinion, is this a present crisis, an imminent crisis or merely a fabricated crisis?

Memory Verse

Jeremiah 12:4

'How long will the land lie parched and the grass in every field be withered? Because those who live in it are wicked, the animals and birds have perished. Moreover, the people are saying, "He will not see what happens to us"'