

## CHAPTER 32

### The Loss of Biospheric Resources: Humanity's Ethical Challenge

*The world is a dangerous place to live, not because of the people who are evil, but because of the people who don't do anything about it.*  
Albert Einstein

*If the earth does grow inhospitable toward human presence, it is primarily because we have lost our sense of courtesy toward the earth and its inhabitants.*  
Thomas Berry

Low-lying islands and estuaries are threatened by sea level rise (Cairns 2009). The country of Kiribati (formerly Gilbert Islands) consists of 33 tiny islands with an average height of 6.5 feet. The islands cover an area over twice the size of the US state of Alaska. More than 90,000 people live there, and food and water are already scarce (<http://npr.org/2011/02/16/133650679/climate-change-and-faith-collide-in-kiribati?ps=rs>).

The crisis in Kiribati is both sad and useful — sad because global changes (sea level rise, food, water) are strongly impacting the lives of the inhabitants and the crisis requires a global solution, and useful because it may provide insights into response to global change. Island biogeography furnishes insights less evident at a global scale. Arguably, the most crucial factor will be humanity's awareness and response to this island crisis, including absence of empathy and remedial measures. Also crucial is the observation that inhabitants of Kiribati are confused about climate change science and their options if the science is persuasive.

Religion adds a new dimension to the crisis: the islands are 55 percent Roman Catholic and 36 percent Kiribati Protestants (Reed 2011). *"Of the more than 90,000 people counted in Kiribati's last census, . . . many are torn between what they hear from scientists and what they read in the Bible"* (Reed 2011). At least some residents who were interviewed apparently believed that the choice was religion or science, although residents of the "nearby" Tuvalu island group seem to show little doubt about the science. *"We live in constant fear of the adverse impacts of climate change. For a coral atoll nation, sea level rise and more severe weather events loom as a growing threat to our entire population. The threat is real and serious, and is of no difference to a slow and insidious form of terrorism against us"* (Prime Minister Saufatu Sopoanga, <http://www.tuvaluislands.com/warming.htm>).

*"The Maldives is one of the small states. We are not in a position to change the course of events in the world. But what you do or do not do here will greatly influence the fate of my people. It can also change the course of world history"* (H. E. Maumoon Abdul Gayoom at the 3<sup>rd</sup> Conference of the Parties of the UNFCCC, Greenpeace International 2006).

The well funded campaign to deny global warming and other types of climate change has been very successful despite a lack of evidence to support this assertion. Some people agree that climate change may be occurring but deny that climate is affected by human activities and deny that the changes are probably hazardous. Still others respond to scientific evidence by stating "it all happened before." Perhaps it has, but *Homo sapiens* has only been on Earth for 200,000 years out of 4.5 billion years. More important, this viewpoint is not a valid reason to avoid planning for highly probable events such as sea level rise.

#### Planning for Climate Change

*"The world is close to reaching tipping points that will make it irreversibly hotter, making this decade critical in efforts to contain global warming, . . ."* (Chestney 2012). However, the past can often help *Homo sapiens* plan for possible future change. For example, *"Scientists have found proof in Bermuda that the planet's sea level was once more than 21 meters (70 feet) higher about 400,000 years ago than it is now"* (ScienceDaily 2009a). If this sea level rise happened in the 21<sup>st</sup> century or later, it would be catastrophic for coastal cities, low islands (e.g., the Bahamas), and deltas (e.g., Ganges). *"About 3.7 million Americans live within a few feet [italics mine] of high tide and risk being hit by more frequent coastal flooding in coming decades because of sea level rise caused by global warming. . ."* (Gillis 2012a). An even more dramatic sea level rise occurred *"since the Last Glacial Maximum (LGM; about 21,000 years*

ago) . . . sea level has risen by 130 meters (430 feet), resulting in continental shelf submergence and a massive expansion of the surface area of the shelf seas” (ScienceDaily 2009b).

Precise replication of these illustrative global changes is unlikely to occur. However, they serve as a warning that dramatic changes, sometimes catastrophic changes, can occur. Such changes always reduce the regeneration of resources.

## Achieving a New Worldview

*Nothing was made by God for man to spoil or destroy.*

John Locke

*Use without abuse of natural systems [i.e., the Biosphere] is essential.*

Ruth Patrick

Global problems can only be addressed at a global level, and a viable worldview must accept this reality. In the United States (and probably elsewhere in the world), some people believe that climate change is part of a conspiracy to enable the United Nations to control the planet. Jokes could be made about this situation, but it is a serious obstacle — the Biosphere and *Homo sapiens* are inextricably linked. The stress is global, so global policies are essential.

Following are some options for consideration in responding to global crises.

- (1) Humanity continues doing nothing and denying the existence of global warming and sea level rise.
- (2) Humanity is entering an age of resource scarcity and ecological overshoot/deficit has been unsustainable since about 1987. The Biosphere can only regenerate a finite amount of renewable resources annually. Therefore, when islands submerge, or deserts expand, or drought occurs, Earth’s carrying capacity for humans is diminished. Any new migrants/immigrants to an area will reduce per capita resources to the extent that resources are shared with migrants. The 20<sup>th</sup> century was atypical in expressing perceptions that resources were unlimited (e.g., Simon 1998).
- (3) Climate change is making the future very uncertain because of such problems as reduced agricultural productivity, exponential human population growth, spread of communicable diseases, freshwater shortages, decreased availability of renewable resources, ecological overshoot/deficit, migrants, and debt.
- (4) Earth’s renewable resources will probably diminish until humanity adjusts to the new global climate it has created.
- (5) Since no magic wand (e.g., affordable, effective technology) exists to diminish carbon dioxide and other greenhouse gases in Earth’s atmosphere, humanity will have to wait until natural processes do so. The Biosphere must be nurtured so that it can perform such ecosystem services expeditiously. This role is new to humans, who have taken biospheric services for granted.
- (6) In order to reduce Earth’s human population compassionately, wealth and resources must be shared more equitably.
- (7) Failure to share wealth and resources more equitably will probably result in pandemic disease, anarchy, or both.

No sovereign nation, however powerful, can resolve the global crises. Financial globalization alone is a sufficient example of this statement. *“Some 32 social scientists and researchers from around the world . . . have concluded that fundamental reforms of global environmental governance are needed to avoid dangerous changes in the Earth system. . . . the time is now for a ‘constitutional moment’ in world politics”* (ScienceDaily 2012).

In the absence of a global policy/regulatory group to protect biospheric regeneration of resources, resource wars are highly probable. They will divert already scarce resources from societal use and decrease resources per capita. This position is a classic lose/lose situation.

Krugman (2008) discusses three competing views on resource prices. (1) Speculation is driving the rise in resource prices. (2) Society will drill more oil wells and plant more acres. (3) *“The third view is that the era of cheap resources is over for good — that we’re running out of oil, running out of land to expand food production and generally running out of planet to exploit. . . . Don’t look now, but the good times may have just stopped rolling.”*

If humanity continues “business as usual,” the global crises will continue. The default position, the universal laws of biology, chemistry, and physics, will determine the outcome, and it will not be pretty.

## Food Prices

*“We have certainly seen intermittent price dips in between the spikes of the last few years, but prices are still at pretty high levels over all. There has been no return to the era of the slowly falling food prices that prevailed in the 1980s and 1990s. Sober forecasters like those in the United States Agriculture Department now expect the era of higher prices to extend into the foreseeable future”* (Gillis 2012b). Biello (2009) states the challenge succinctly: humankind is now faced with *“solving climate change, the Sixth Great Extinction and population growth . . . at the*

same time.” Clearing more land for agriculture would mean loss of forests that are good carbon sinks. “Agriculture is the main driver in most ecological problems on the planet. . . . We are literally eating away the other species on the planet” (Economist Jeffrey Sachs as quoted in Biello 2009).

### **Biospheric Refugees**

All refugees on Earth can only move from one part of the Biosphere to another, so they could be designated biospheric refugees. Earth has finite resources (even renewable resources are finite because the Biosphere can only regenerate a limited amount). So, resources per capita are decreasing both because of human population growth and decreased biospheric productivity. However, when refugees move to an area they perceive as richer in resources than the one they left, further regional reduction of resources per capita will occur. Sea level rise will significantly increase the number of refugees, and the areas to which they migrate may already be suffering from loss of jobs, overcrowded schools, needed infrastructure maintenance, water shortages, and tax revenues.

*“Rising sea level threatens existing coastal wetlands. Overall ecosystems could often survive by migrating inland, if adjacent lands remained vacant. On the basis of 131 state and local land use plans, we estimate that almost 60% of the land below 1 m [meter] along the US Atlantic coast is expected to be developed and thus unavailable for the inland migration of wetlands. Less than 10% of the land below 1 m has been set aside for conservation”* (Titus et al. 2009). A public discourse on this topic is badly needed, but it must include scientific evidence on probable consequences of continuing “business as usual” and the probable risks of changes likely to occur (e.g., sea level rise).

### **Managing the Risks of Extreme Events and Disasters**

*“Exposure and vulnerability are key determinants of disaster risk and impacts when risk is realized . . . Extreme and non-extreme weather or climate events affect vulnerability to future extreme events by modifying resilience, coping capacity, and adaptive capacity”* (Intergovernmental Panel on Climate Change [IPCC] 2012).

The Summary for Policymakers in the IPCC report (2012) “relies on two metrics for communicating the degree of certainty in key findings” in the report

- *Confidence in the validity of a finding, based on the type, amount, quality, and consistency of evidence (e.g., mechanistic understanding, theory, data, models, expert judgment) and the degree of agreement. Confidence is expressed qualitatively.*
- *Quantified measures of uncertainty in a finding expressed probabilistically (based on statistical analysis of observations or model results, or expert judgment).*

Complex systems, such as the Biosphere, are poorly understood, but all are structured by the universal laws. Scientists gather evidence on how these laws function and increase humanity’s understanding of them. Scientists are not engaged in a conspiracy or perpetuating a hoax as the “merchants of doubt” would like the general public to believe. Almost every person on the planet benefits each day from past scientific research. Neither technology nor legislation can protect humanity from the consequences of ignoring universal laws. Carrying capacity merely means that, if population increases exponentially and resources (e.g., food) do not, then misery, disease, and death will result. If population is not stabilized within the Biosphere’s long-term carrying capacity by humanity, the universal laws will do so. No risk management can be undertaken without scientific evidence.

### **Conclusions**

Stated bluntly, the climate wars predicated on various worldviews (e.g., Mann 2012) must cease. However, just this cessation is not enough. Casting doubt on scientific evidence without supporting evidence should be unacceptable. Mentioning the extinction of humankind is almost taboo, but this extinction could be an unintended consequence of the war on science. The Biosphere, the source of renewable resources and ecosystem services, could collapse if “business as usual” continues. Many species have already been driven to extinction by anthropogenic practices, and many more could follow. Scientists have not observed the collapse of a Biosphere, so the exact location of crucial tipping points resulting in irreversible change are not well known. Excessive optimism is not only unjustified — it is dangerous.

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