

## AS I SEE IT

## Small islands: harbingers of Earth's ecological fate?

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*How would you like your pain served?*

Michael Sutton, Packard Foundation

A colleague, P. Kullberg, sent me an article from *Le Monde Diplomatique* about the effects of climate change on the world's fragile islands.<sup>1</sup> In the approximately 600 islands of Micronesia in the South Pacific, about half of the 150,000 inhabitants have had houses damaged or destroyed by storms more frequent and violent than before. Sea level rise in the last half of the twentieth century and above normal high tides and unpredictable rain have exacerbated the intensity of the storms.

Arguably, Darwin was the first person to use islands to study speciation and other biological phenomena that occur more rapidly on islands than on large land masses. Islands are still very useful systems for observing the early effects of global warming. Low-lying islands are particularly vulnerable to sea level rise and climate change. Now, in the twenty-first century, islands may offer insights into ecological processes comparable to those discovered by Darwin. However, the insights will be at the systems level rather than the species level.

Since humankind persists in carrying out a global experiment (e.g. global warming) with the planet's ecological life support system, islands are already serving as an early warning of system level effects before the effects can be discerned readily in larger systems. The Alliance of Small Island States has been acutely aware of the problems of sea level rise and climate change on small islands. The problem is to communicate their distress to the global community. These small islands may be an important harbinger of Earth's

ecological fate. Will a sufficient number of people, especially those with large ecological footprints, feel it is an ethical imperative to reduce markedly the production of greenhouse gases to arrest global warming?

The people of the Maldives are already preparing for worsening conditions.<sup>2</sup> They have started building an artificial island 2 m above sea level which eventually will serve 100,000 people. Rising water levels, increased surface water temperatures, and violent storms already threaten the coral reefs of the archipelago (Inter-Governmental Panel on Climate Change 2001). If the coral reefs are seriously damaged, a major destabilization of coastal marine ecosystems is highly probable. Even though the Great Barrier Reef of Australia is endangered, Australia joined the United States and Russia in refusing to sign the Kyoto Protocol. However, ratification would be possible if Russia ratified the Protocol. Some heavily industrialized countries, mostly in the north, fear serious economic consequences if the Protocol is ratified. Some leaders of powerful nation-states are adamant in their opposition to ratifying Kyoto, which must be ratified by no fewer than 55 countries that account for at least 55% of global emissions in 1990. Powerful financial interests backing these leaders have a major influence through both corporate ownership and threats to withdraw political campaign contributions and advertising in the news media. Worse yet, rapidly developing countries, such as China, India, and Brazil, will substantially increase their production of greenhouse gases in the first half of the twenty-first century.

<sup>1</sup>See Sinai A (2004) Climate change: the world's fragile islands. *La Monde Diplomatique*, available at <http://mondediplo.com/2004/02/15climate>

<sup>2</sup>See Footnote 1

India and China refuse to consider reducing greenhouse gas emissions until the industrialized nations decrease their emissions. It is not clear how soon reduction in the output of greenhouse gases would reverse global warming trends, and, if a major ecological tipping point is passed, irreversible change will occur. Obtaining a technological solution to this problem has a much greater uncertainty than the uncertainties in the global warming predictive models; however, the scientific uncertainty has received much political attention, while the technological uncertainties have not.

A massive change in societal attitudes will be necessary to initiate a paradigm shift on greenhouse gases. Many people in wealthy countries have a large ecological footprint as a consequence of high energy use and consumption of material goods. If society altered its lifestyles and behavior to arrest global warming, humankind would not be rapidly approaching an ecological tipping point. The fate of these small islands and coral reefs indicates that a major ecological tipping point either has been or will soon be reached.

At present, it appears unlikely that an ethical tipping point (a majority acting on ethical rather than economic principles) will be reached in the near future. Reaching an ethical tipping point before reaching an ecological tipping point would, in the long run, be far less harmful to life on Earth, including humans. For much of the time *Homo sapiens* has been on the planet, comprehending the consequences of drastically altering complex, multivariate systems were not necessary. If society's ethics do not reflect what is happening to Earth, society can and almost certainly will make serious, possibly fatal, mistakes. Since an estimated 99% of all species have become extinct (R. Kaesler, pers. comm.), prudence dictates not stressing the planet's ecological life support system so that Earth stays well away from a major tipping point.

Hope exists, however. Late in 2003, the US Senate voted (43 for; 55 against) on the Climate Stewardship Act (CSA), Senate Bill 139. Although the bill did not pass, it received strong bipartisan support, and the bill's chief sponsors, Senators McCain and Lieberman, are committed to moving forward with the bill and hope for another vote in 2004. Regrettably, the US House of Representatives does not have a companion bill to the CSA. The CSA envisions a reduction by 2010 in emissions of heat-trapping gases to the levels of 2000. This aspiration is hardly a great leap forward but, if passed, would reverse the trend. Since the United States is the biggest contributor of greenhouse gases, legislation of this type is a major step toward arresting global warming if the bills are passed, the deadlines are met, and the legislation is enforced.

The so-called 'Pentagon Report' has warned against catastrophic consequences of global warming in the next 20 years. The British newspaper *The Observer* has warned that a suddenly warming climate is a threat to global political stability — a threat much greater than the one posed by terrorism.<sup>3</sup> In Schwartz and Randall's 2003 report entitled 'An Abrupt Climate Change Scenario and Its Implications for United States National Security'<sup>4</sup> the authors note the situation that has been obvious to mainstream science for many years: once temperature rises above an ecological threshold or 'tipping point', adverse weather conditions could develop rather abruptly. The authors caution that the depicted scenario is extreme in that the effects noted may be regional rather than global and the magnitude may be substantively less. Still, even if the outcome is uncertain but major deleterious effects are likely, precautionary measures are justified. For example, formal ratification of the Kyoto Protocol seems justified since the economic effects of some of the consequences of global warming are likely to be much more costly than remedial measures. Three important tipping points exist in Schwartz and Randall's scenario.<sup>5</sup>

1. The economic tipping point — how much evidence is essential to show that the costs of unsustainable practices outweigh the benefits?
2. The ecological tipping point — how much stress can Earth's ecological life support system take before irreversible effects occur?
3. The unethical tipping point — when, if ever, will awareness of unethical behavior be sufficiently evident to induce ethical behavior?

The answers to these questions will have much to do with the long-term fate of humankind and the short-term fate of life on Earth. At present, judging from the relative amount of attention given these three issues in the United States and a number of other countries, the economic tipping point is the one most likely to invoke precautionary measures. The ecological tipping point would be second because a steadily increasing number of people are advocating precautionary measures based on increasingly persuasive evidence that going beyond the ecological tipping point will have serious, probably destabilizing, effects upon global economics (e.g. abrupt climate change). Exceeding the first two tipping points will result in destabilization of the two

<sup>3</sup>Available at <http://www.ens-newswire.com/ens/feb2004/2004-02-23-09.asp#anchor1>

<sup>4</sup>Full PDF report (917kb) available for download at [http://www.ems.org/climate/pentagon\\_climate\\_change.html](http://www.ems.org/climate/pentagon_climate_change.html). Radio interview with author Peter Schwartz, 'On Point: Abrupt climate change', aired 3 March 2004, available at [http://www.onpointradio.org/shows/2004/03/20040303\\_b\\_main.asp](http://www.onpointradio.org/shows/2004/03/20040303_b_main.asp)

<sup>5</sup>See Footnote 4

systems. Exceeding the tipping point of unethical behavior and replacing it with ethical behavior should go a long way towards protecting all three systems — economic, ecological, and ethical.

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