

Rising Tide

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The increasing threat of natural disasters has long been cited as one of many reasons why society should reduce greenhouse gas emissions, and the horrendous toll of the December 26 Indonesian earthquake and resulting tsunami has only made those calls louder. A December 30 article in *Salon* portrays the effects of the recent tsunami as "visions of just the kind of tumultuous weather that scientists have long viewed as a symptom of global warming." A day later, Sir David King, Britain's chief science adviser, told the BBC, "What is happening in the Indian Ocean underlines the importance of the Earth's system to our ability to live safely. And what we are talking about in terms of climate change is something that is really driven by our own use of fossil fuels."

Such arguments have a rich pedigree. Only nine days before the tsunami, Klaus Toepfer, executive director of the U.N. Environment Programme, said, "Climate scientists anticipate an increase [in] intensity of extreme weather events." Environmental groups use the threat of increasing disasters to advocate decisive action to reduce the emission of greenhouse gases and implement the Kyoto Protocol on climate change. The advocacy group Scientists and Engineers for Change supported John Kerry in the 2004 election by posting billboards in storm-ravaged Florida with the message, GLOBAL WARMING = WORSE HURRICANES. GEORGE BUSH JUST DOESN'T GET IT.

Global climate change is real, and developing alternative energy sources and reducing global carbon-dioxide emission is essential. But the claim that action to slow climate change is justified by the rising toll of natural disasters--and, by extension, that reducing emissions can help stanch these rising losses--is both scientifically and morally insupportable. To minimize damage from tsunamis and the like, we need to focus not on reducing emissions but on reducing our vulnerability to disasters.

The first thing to understand about disasters is that they have indeed been rapidly increasing worldwide over the past century, in both number and severity, and that the causes of this increase are well understood--and have nothing to do with global warming. Data from the Center for Research on the Epidemiology of Disasters in

Brussels, Belgium, as well as the Red Cross and the reinsurance industry, show that the number of disasters affecting at least 100 people or resulting in a call for international assistance has increased from an average of about 100 per year in the late '60s to between 500 and 800 per year by the early twenty-first century. The reason is not an increase in the frequency or severity of storms, earthquakes, or similar events, but an increase in vulnerability because of growing populations, expanding economies, rapid urbanization, and migrations to coasts and other exposed regions.

These changes are reflected in the costs of major disasters, which, according to the German insurance company Munich Re, rose more than tenfold in the second half of the twentieth century, from an average of about \$4 billion per year in the 1950s to more than \$40 billion in the 1990s, in inflation-adjusted dollars. The great Miami hurricane of 1926, for example, caused about \$76 million in damage; when Hurricane Andrew, of similar force, struck South Florida in 1992, it caused more than \$30 billion in damage, again adjusted for inflation. Research suggests that, if the same 1926 storm were to hit Miami today, it would cost more than \$80 billion.

The economic losses from disasters are increasingly concentrated in the affluent world. But, as a percentage of GNP, the economic effects of natural disasters on poor countries can be hundreds of times greater. Damages from Hurricane Mitch, for example, which devastated Central America in 1998, were estimated at between \$5 and \$7 billion--or almost the annual combined total economic activity of the two hardest-hit nations, Honduras and Nicaragua. Their economies still have not recovered. By comparison, the magnitude 6.7 earthquake that struck California in 1994, one of the costliest disasters in U.S. history, caused an estimated \$20 to \$40 billion in losses, but this amounted to only 2 to 4 percent of California's economic activity.

Disasters disproportionately harm poor people in poor countries because those countries typically have densely populated coastal regions, shoddily constructed buildings, sparse infrastructure, and grossly inadequate public health capabilities. Poor land use leads to widespread environmental degradation, such as deforestation and wetlands destruction, which in turn exacerbates flooding and landslides. Emergency preparation and response capabilities are often inadequate, and hazard insurance is usually unavailable, further slowing recovery. Thus, while the world's poorest 35 countries make up only about 10 percent of the world's population, they suffered more than half of the disaster-related deaths between 1992 and 2001.

Disparities in disaster vulnerability between rich and poor will continue to grow. About 97 percent of population growth is occurring in the developing world. This growth, in turn, drives urbanization and coastal migration. The result is that, in the next two decades, the population of urban areas in the developing world will likely increase by two billion people. And this population is being added to cities that are mostly located on coastal or flood plains--or in earthquake zones--and are unable to provide the quality of housing,

services, infrastructure, and environmental protection that can help reduce vulnerability. Uncontrolled urban growth exacerbates hazards and urban growth.

Faced with the inescapable momentum of these socioeconomic trends as we clean up from the South Asian disaster, the crucial question is this: What can be done to better prepare the world--especially the developing world--for future disasters? It is absurd to suggest that reducing greenhouse gas emissions is an important part of the answer.

The chief reason is that the role of demographics in making a country vulnerable to disaster overwhelms that of a warming atmosphere. Indeed, the most recent assessment of the scientifically authoritative Intergovernmental Panel on Climate Change (IPCC) found no evidence to support the idea that human-caused climate change has discernibly influenced the rapidly increasing disaster toll of recent decades. While ipcc data and predictions indicate that human-caused climate change may have an effect on future disasters, our analysis of hurricanes and tropical cyclones, using ipcc data and assumptions, shows that, for every \$1 of additional disaster damage scientists expect will be caused by the effects of global warming by 2050, an additional \$22 to \$60 of damages will result from the growth of economies and populations. Other studies of hurricanes, flooding, and heat waves lead to a similar conclusion: Socioeconomic trends, not climate change, will continue to drive increasing disaster losses.

The example of rising sea levels provides further illustration. Scientists expect that, by 2050, average global sea levels will rise by two to twelve inches. But no research suggests that the Kyoto Protocol, or even more ambitious emissions-reduction proposals, would significantly reduce this increase. Meanwhile, coastal populations will continue to grow by hundreds of millions, mostly in developing countries. Bangladesh alone, which suffered about 140,000 deaths from a cyclone in 1991, may add up to 100 million people to its population by 2050. The world will indeed be more vulnerable to tsunamis in the future, but, once again, the causes are primarily socioeconomic change, not climate change.

Yet assertions that global warming is directly linked to rising disaster losses persist. Such assertions may have short-term political benefits in the global warming debate, but they detract from serious efforts to prepare for disasters. Global climate change has been a potent focusing lens for environmental groups, governments, the scientific research establishment, and international bodies, especially the United Nations. The U.N. Framework Convention on Climate Change--and its Kyoto Protocol mandating emissions reductions--occupies thousands of advocates, diplomats, scientists, lawyers, and journalists. The climate change policy agenda has also sucked into its maw a wide range of other issues, such as energy policy, water policy, public health and infectious diseases,

deforestation, and, of course, disasters. Climate change thus captures a huge proportion of the public attention, political energy, and financial and intellectual resources available for addressing global environmental challenges--including disaster preparedness.

The U.N. Framework Convention, for example, refused to fund disaster preparedness efforts at its last conference in December unless states could demonstrate exactly how the disasters they feared were linked to climate change. Consider, too, the amount spent on scientific research. According to a recent RAND study, U.S. funding of disaster loss-reduction research in 2003 amounted to about \$127 million--only 7 percent of the amount invested in climate change research for that year. Efforts in Congress to create a coordinated research program focused on reducing disaster losses have never gained momentum. By contrast, the U.S. government has sponsored a coordinated, multi-agency framework for climate change research for more than 15 years, with total investments, by our calculations, of more than \$30 billion, adjusted for inflation.

This is not to say that many thousands of people and hundreds of organizations worldwide are not productively confronting disaster vulnerability, but their efforts do not begin to address the magnitude of the problem. Thousands of participants from most of the world's nations, along with scientists and political advocates, have come together every year since 1995 to work toward concerted international action on climate change. But, when the U.N. World Conference on Disaster Reduction convenes later this week, it will be the first such meeting in more than a decade.

While the prospects for global climate change are constantly in the public eye, the South Asian earthquake and tsunami poignantly demonstrate that the crisis of growing disaster vulnerability only becomes news after disaster strikes. Yet we know that effective action is possible to reduce disaster losses even in the face of poverty and dense population. During the 2004 hurricane season, Haiti and the Dominican Republic, both on the island of Hispaniola, provided a powerful lesson in this regard. As Julia Taft of the U.N. Development Program explained: "In the Dominican Republic, which has invested in hurricane shelters and emergency evacuation networks, the death toll was fewer than ten, as compared to an estimated two thousand in Haiti.... Haitians were a hundred times more likely to die in an equivalent storm than Dominicans."

Most tools needed to reduce disaster vulnerability already exist, such as risk assessment techniques, better building codes and code enforcement, land-use standards, and emergency-preparedness plans. The question is why disaster vulnerability is so low on the list of global development priorities. Says Brian Tucker, president of GeoHazards International, "The most serious flaw in our current efforts is the lack of a globally accepted standard of acceptable disaster vulnerability, and an action plan to put every country on course to achieve this standard. Then we would have a means to measure progress and to make it clear which countries are doing well and which are not. We need a natural disaster equivalent to the Kyoto Protocol."

Those who justify the need for greenhouse gas reductions by exploiting the mounting human and economic toll of natural disasters worldwide are either ill-informed or dishonest. This is not, as Britain's Sir David King suggested, "something we can manage" by decreasing our use of fossil fuels. Prescribing emissions reductions to forestall the future effects of disasters is like telling someone who is sedentary, obese, and alcoholic that the best way to improve his health is to wear a seat belt.

In principle, fruitful action on both climate change and disasters should proceed simultaneously. In practice, this will not happen until the issues of climate change and disaster vulnerability are clearly separated in the eyes of the media, the public, environmental activists, scientists, and policymakers. As long as people think that GLOBAL WARMING = WORSE HURRICANES, global warming will also equal less preparation. And disasters will claim ever more money and lives.

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