

coastal areas. Both the reports discussed above go into great detail with respect to potential disruptions to both ecological and human systems and the natural and human costs involved. The costs are serious and should be of concern to all citizens.

A second reason for concern is that the ability of human systems to adapt to and cope with climate change depends on many factors often associated with wealth (technology, education, information, skills, infrastructure, resources, etc.). As a consequence, the effects of climate change are expected to fall disproportionately on the developing countries and on the poor of all countries. There are significant ethical issues associated with this widening gap between rich and poor. There are political issues associated with the U.S. willingness (or lack of it) to provide leadership to reduce this gap. There are also pragmatic issues. Currently, the United States is preoccupied with the sparks of terrorism but seems to be ignoring the fact that poverty is the tinder of terrorism. Viewed in a holistic context, reducing the volatility of the tinder by reducing the gap between rich and poor could be viewed as an important element toward making the world "safe from terrorism."

A third concern, for us as Americans, is that we are by far the biggest offenders on the planet. The United States, with a population of about 300 million, is the third most populous country in the world, after China and India. With less than 5% of the world's population, we contribute about 25% of all the greenhouse gas emissions. In spite of this, our current administration has refused to participate in the Kyoto Protocol, an international treaty that calls for the mandatory reduction of greenhouse gases by industrial nations. Equally disturbing, the current administration in Washington has been unwilling to provide leadership in this area or to formulate a real alternative. Others have not been so stubbornly out of step. Japan and the 15 members of the European Union recently ratified the Kyoto Protocol, and Russia is committed to ratification soon. In the United States, there are both cities and states declaring their intent to reduce greenhouse gas emissions in line with the Kyoto goals and deadlines. For example, the California Legislature recently passed and Governor Davis signed into law, the California Climate Bill, which regulates greenhouse gas emissions from motor vehicles. (See, for example, the Union of

Concerned Scientists' Web page at <http://www.ucsaction.org> for details.) These local efforts should be encouraged and supported by all concerned citizens.

Our challenge to action is to reduce further warming by gradually weaning ourselves from fossil fuels (coal, oil, and natural gas). We need a sound energy policy that would include setting realistic, binding targets for reducing emissions that give companies the flexibility to achieve them as affordably as possible

and moving away from fossil fuels to renewable resources such as solar and wind energy, hydropower, and carbon-neutral technologies such as biomass. More information on alternate sources of energy is available at <http://www.realgoods.com>.

We now know that "most of the warming observed over the past 50 years is attributable to human activities." A wide range of evidence is there for all to see. Analogous to the canaries in the mine, many now recognize the warnings from

our sensitive ecosystems. What remains to be seen is if we have the political concern, moral integrity, and collective will to act while there is still time to keep the costs of global climate change (direct, adaptive and mitigation costs) within reason. The direct costs of change for example could include flood damage to coastal areas, increase in disease, crop loss, etc.; adaptive costs would likely include moving folk from coastal areas and building dikes; and mitigation costs would be increased cost in manufacturing to reduce emissions and added cost to motor vehicles (if any) to reduce emissions. All of these costs will grow exponentially with time, but many argue that "upfront" costs aimed at mitigation now will reduce the direct costs of change as well as the costs associated with adaptation later on.

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