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OP-ED CONTRIBUTOR

The Earth Is Crying Out for Help

By THOMAS LOVEJOY

As national leaders and others assemble in Copenhagen for the climate change negotiations, the whole subject must seem a mystifying cloud of acronyms, numbers and data. But as important as all these are in crafting an action plan, they completely obscure the fact that the planet works as a biological as well as a physical system.

That biophysical system (the biosphere and atmosphere together) is the key to understanding the urgency of climate change as well as crafting a truly meaningful response.

Everywhere one looks on the planet, nature is on the move in ways never seen before by natural science. Species are changing the timing of their life cycles, and some are already moving and changing where they occur. We are beginning to see a decoupling of tight links in nature in which one element is cued by day length and the other by temperature. With the earlier arrival of spring, for example, snowshoe hares are now no longer camouflaged by their brilliant white winter coats because they are in snowless landscapes — completely obvious to predators.

Of greater consequence, ecosystem failure has begun to take place. Five percent of humanity depends on and lives within 100 meters of tropical coral reefs. A temperature increase causes the reef's basic partnership between coral animals and algae to break down. With temperature stress, the coral animal ejects the alga and the ecosystem undergoes "bleaching events": The brilliantly colorful reef essentially goes black and white as attendant diversity and productivity crash.

Similar ecosystem failure is occurring in the coniferous forests of North America as milder winters and longer summers tip the balance in favor of native bark beetles. In the United States, approximately 22 million acres are currently projected to be affected. It is an enormous forest and fire management problem. It is hard to project what the future of these forests will be.

The implications for agricultural ecosystems is equally worrisome. Australia has had to abandon rice as a major export crop because of persistent drought (an early manifestation of climate change). Dwindling glaciers and glacial melt threaten agricultural productivity in many parts of the world. Lester Brown, founder of the Earth Policy Institute, projects considerable difficulty in maintaining current agricultural practice and production in the face of rising global temperatures.

Vast as it may be, the Amazon seems perilously close to a tipping point. For some time a dieback of the forest in the southern and southeastern Amazon has been projected by one of the climate models, first at 2.5 degrees global temperature increase but more recently at 2.0. Recent studies that include the effects of deforestation and fire as well as climate change show the initiation of dieback perilously close — just years away.

Were that to happen, the loss of biodiversity, the carbon added to the atmosphere and the impact on people in the region would be horrific. The good news is that aggressive reforestation could add a safety margin and reduce the imminence of the tipping point.

The oceans, so important to us for seafood, have become 30 percent more acid because of higher concentrations of CO_2 in the atmosphere. This ultimately will affect all the tens of thousands of marine species that build skeletons or shells of calcium carbonate. Effects are already being noticed at the base of some ocean food chains.

The living planet is signaling very clearly that current greenhouse gas concentrations are already too high.

So the challenge becomes not only to find ways to reduce emissions from deforestation ("REDD") and other land-use change, but also to identify ways to pull CO_2 out of the atmosphere.

Because all living things are built of carbon, restoring ecosystems on a planetary scale can contribute in a meaningful way. Actions that can capture carbon include reforestation, restoring degraded grasslands and grazing lands and managing agriculture to return carbon into the soils.

There is no single reliable number for the carbon capture potential of ecosystem restoration globally, but an ambitious program might reduce planetary CO_2 concentrations by as much as 40 parts per million. That is the difference between current level (roughly 390 p.p.m.) and the 350 p.p.m. that is the upper limit for dangerous interference with ecosystems.

As important as such a reduction would be, it is insufficient. The chairman of the Intergovernmental Panel on Climate Change, Rajendra Pachauri, has called for a major effort to suck CO_2 out of the atmosphere. A major research effort to examine additional ways to remove CO_2 without environmental side effects must be a global priority.

This is generically different than most geoengineering schemes. Most of these only address temperature (the symptom) rather than CO_2 (the cause) and hence are not a real fix. Further, the risk of unintended detrimental effects is inherently high because most geoengineering proposals are planetary in scale.

It is clear that the targets and timetables most nations are bringing to the table at Copenhagen are insufficient to safeguard the living planet and the biological underpinnings of sustainability.

The United States, entering late in the game, is proposing a goal that is but a 5.5 percent reduction below 1990 levels. The equivalent number for China is an increase of 253 percent and

for India, 229 percent. Brazil's emissions (without land use change) would increase 15 percent.

They can be a basis for meaningful discussions and initial lines of action, but only in a context that respects this planet for the biosphere it is.

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