

why climate change isn't our biggest environmental problem, and why technology won't save us

Our core ecological problem is not climate change. It is overshoot, of which global warming is a symptom. Overshoot is a systemic issue. Over the past century-and-a-half, enormous amounts of cheap energy from fossil fuels enabled the rapid growth of resource extraction, manufacturing, and consumption; and these in turn led to population increase, pollution, and loss of natural habitat and hence biodiversity. The human system expanded dramatically, overshooting Earth's long-term carrying capacity for humans while upsetting the ecological systems we depend on for our survival. Until we understand and address this systemic imbalance, symptomatic treatment (doing what we can to reverse pollution dilemmas like climate change, trying to save threatened species, and hoping to feed a burgeoning population with genetically modified crops) will constitute an endlessly frustrating round of stopgap measures that are ultimately destined to fail.

The ecology movement in the 1970s benefitted from a strong infusion of systems thinking, which was in vogue at the time (ecology—the study of the relationships between organisms and their environments—is an inherently systemic discipline, as opposed to studies like chemistry that focus on reducing complex phenomena to their components). As a result, many of the best environmental writers of the era framed the modern human predicament in terms that revealed the deep linkages between environmental symptoms and the way human society operates. *Limits to Growth* (1972), an outgrowth of the systems research of Jay Forrester, investigated the interactions between population growth, industrial production, food production, resource depletion, and pollution. *Overshoot* (1982), by William Catton, named our systemic problem and described its origins and development in a style any literate person could appreciate. Many more excellent books from the era could be cited.

However, in recent decades, as climate change has come to dominate environmental concerns, there has been a significant shift in the discussion. Today, most environmental reporting is focused laser-like on climate change, and systemic links between it and other worsening ecological dilemmas (such as overpopulation, species extinctions, water and air pollution, and loss of topsoil and fresh water) are seldom highlighted. It's not that climate change isn't a big deal. As a symptom, it's a real doozy. There's never been anything quite like it, and climate scientists and climate-response advocacy groups are right to ring the loudest of alarm bells. But our failure to see climate change in context may be our undoing. Why have environmental writers and advocacy organizations succumbed to tunnel vision?

Perhaps it's simply that they assume systems thinking is beyond the capacity of policy makers. It's true: if climate scientists were to approach world leaders with the message, "We have to change everything, including our entire economic system—and fast," they might be shown the door rather rudely. A more acceptable message is, "We have identified a serious pollution problem, for which there are technical solutions." Perhaps many of the scientists who did recognize the systemic nature of our ecological crisis concluded that if we can successfully address this one make-or-break environmental crisis, we'll be able to buy time to deal with others waiting in the wings (overpopulation, species extinctions, resource depletion, and on and on).

If climate change can be framed as an isolated problem for which there is a technological solution, the minds of economists and policy makers can continue to graze in familiar pastures. Technology—in this case, solar, wind, and nuclear power generators, as well as batteries, electric cars, heat pumps, and, if all else fails, solar radiation management via atmospheric aerosols—centers our thinking on subjects like financial investment and industrial production. Discussion participants don't have to develop the ability to think systemically, nor do they need to understand the Earth system and how human systems fit into it. All they need trouble themselves with is the prospect of shifting some investments, setting tasks for engineers, and managing the resulting industrial-economic transformation so as to ensure that new jobs in green industries compensate for jobs lost in coal mines.

The strategy of buying time with a techno-fix presumes either that we will be able to institute systemic change at some unspecified point in the future even though we can't do it just now (a weak argument on its face), or that climate change and all of our other symptomatic crises will in fact be amenable to technological fixes. The latter thought-path is again a comfortable one for managers and investors. After all, everybody loves technology. It already does nearly everything for us. During the last century it solved a host of problems: it cured diseases, expanded food production, sped up transportation, and provided us with information and entertainment in quantities and varieties no one could previously have imagined. Why shouldn't it be able to solve climate change and all the rest of our problems?

Richard Heinberg,
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