

The other half of the global carbon dioxide problem

SIR—Your article “Half-truths make sense (almost)” has missed half of the problem (and solution) by proposing only a supply-side solution. The rate of change of atmospheric carbon dioxide is associated with changes in its major sources and sinks, which are biotic, not industrial². The literature focuses on comparing quantities of carbon in different pools rather than fluxes between them, which are poorly known, except for combustion. This emphasizes large pools, which slowly exchange with the atmosphere (fossil fuels, soil humus, the deep ocean, limestones, volcanic gases) over smaller ones, which exchange much more rapidly (the tropical biota). Hence it artificially obscures the other key to the atmospheric CO₂ problem, which is to protect the metabolism of the tropical biota, the primary determinant of atmospheric composition.

Current land ‘development’ practices that ignore changes in community ecophysiology have a large hidden price tag. They diminish³ the capacity of the biosphere to modulate atmospheric CO₂, which increases the magnitude and duration of climatic alteration^{4,5} beyond those forecast by conventional climate models. There are two real limiting options. First, destruction of biota and conversion of productive ecosystems to degraded secondary habitats increases combustion-derived atmospheric CO₂, which dissolves in the deep sea on a 10³ year timescale, and becomes incorporated into marine sedimentary carbonates and organic matter on a 10⁵ year timescale. Avoidance of the worst risks of the greenhouse effect will require global limits and national quotas on combustion¹. The second missing option is to conserve remaining undisturbed habitats that cycle carbon rapidly (like tropical rainforests and coral reefs) and to undertake pantropical replanting and fertilization to restore productivity to degraded areas.

Atmospheric CO₂ is held down by rapid recycling through the biota, and the ultimate fate of most added carbon is soil and sediment organic carbon, further enhancing soil productivity. To escape the greenhouse problem by renewable resource-based land management is much the cheapest option in the long run, and has many advantages. Solutions equitable to all countries demand cooperation. The price of fossil fuel should include its long-term environmental costs as an added ‘energy-growth’ tax, which transfers income from fuel burners to environmentally sound tropical development. The sooner such a course is adopted the greater the benefit and the lower the cost.

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