Minimizing the greenhouse effect

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The issue of climate change is by its nature potentially divisive, so caution may be in everyone's long-term interest. International collaboration is essential as no single nation or region is likely to want to bear all costs of mitigation and adjustment. The political obstacles to global collaboration are substantial, however, as different nations and regions have conflicting interests. Creating an effective international system for rationing and curtailing greenhouse gas emissions will take time. In the meantime, other opportunities for collaboration exist. The development community should outline a policy and research program for sustainable economic development that addresses the implications of the greenhouse effect. Clearly the energy sector should get strong attention, but such sectors as agriculture and urban systems are also of importance as emitters of various greenhouse gases — and agriculture could be a sink for carbon.

What we know

We have known since late in the last century that the earth's climate system could warm because of atmospheric emissions and the radiant properties of industrial and agricultural "greenhouse gases." The theory of the "greenhouse effect," conceived more than a century ago by the French mathematician, J-B. Fourier (1827), was given support by Tyndall's studies (1861) on the absorption of heat by gases. The Swedish physical chemist Svante Arrhenius (1896) first calculated that a global warming of 3.2 to 4.0 degrees Celsius (C.) would result from a doubling of the earth's atmospheric concentration of carbon dioxide, a level that could be attained sometime in the next century. The theory of the greenhouse effect has passed from conception to hypothesis to the consensus view that it is both real *and* probably the driving force behind global climate change in our day (Jaeger 1988a).

The greenhouse effect is both normal and essential to life on earth. Without it, the earth would be more than 30 degrees C. (60 degrees Fahrenheit) cooler, and life as we know it would not exist. It is the additional greenhouse effect — the legacy of industrial revolution — that poses a threat to society. The extent and character of future changes will reflect human choices — about the use of fossil fuels, among other things.

The emission of greenhouse gases is expected to increase the global mean temperature more and faster than ever before in mankind's history. Current models predict a warming of 1.5 degrees to 4.5 degrees C. within the next century. The earth's temperature rose only 0.5 to 0.7 degrees C. in the last century, and probably has not varied more than 1 to 2 degrees C. in the last