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Global warming and sustainable development

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The term “development” implies changes in a direction that represents an improvement of the human condition, while “sustainable” implies that this will continue indefinitely, or at least for a very long time. One of the major impediments to this continued improvement is global warming, and Amazonia is one of the areas that is expected to suffer the worst consequences if this climate change is allowed to proceed without dramatic reductions in greenhouse gas emissions. Global warming affects both temperature and precipitation, but the changes are very uneven throughout the world. For most of the world, increased temperatures will bring more precipitation because, as the oceans warm, more water will evaporate and this must fall as precipitation somewhere. However, in Amazonia this is not what is expected. Rather, two different phenomena, both aggravated by global warming, are expected to intensify droughts in the region. One is El Niño, which provokes droughts and forest fires in the northern part of Amazonia, such as the Great Roraima Fire of 1997-1998. El Niño is triggered by warm water in the Pacific Ocean. A second form of Amazonian drought is triggered by warm water in the Atlantic. This causes droughts in the southern and western portions of Amazonia, as in the disastrous drought of 2005. A recent modeling study indicates that the frequency of this type of drought would increase dramatically within the next few years if atmospheric concentrations of greenhouse gases are allowed to increase in a “business-as-usual” fashion. The annual probability of a drought of the magnitude of the 2005 event was 5% in 2005, but would increase to 50% in 2025 and 90% in 2060. These changes threaten the survival of the Amazon forest, and with it the prospects for sustainable development in the region, including this author’s proposal for sustaining the region’s rural population based on the forest’s environmental services. The future climate changes in Amazonia depend on decisions about emissions. As one of the countries most threatened by global warming, Brazil should be taking the lead in reducing emissions by taking on commitments to reduce Amazonian deforestation, which is the principal source of Brazil’s substantial emissions of greenhouse gases.