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The economic value of the climate regulation ecosystem service provided by the Amazon rainforest

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The rainy Amazon climate allowed important activities to develop in the region as large rainfed agricultural lands and hydropower plants. The Amazon rainforest is an important source of moisture to the regional atmosphere and helps regulate the local climate. The replacement of forest by agricultural lands decreases the flux of water vapor into the atmosphere and changes the precipitation patterns, which may severely affect such economic activities. Assign an economic value to this ecosystem service may emphasize the significance to preserve the Amazon rainforest. In this work, we provide a first approximation of the quantification of the climate regulation ecosystem service provided by the Amazon rainforest using the marginal production method. We use climate scenarios derived from Amazon deforestation scenarios as input to crop and runoff models to assess how land use change would affect agriculture and hydropower generation. The effects of forest removal on soybean production and on cattle beef production can both be as high as US$ 16 per year per ha deforested, and the effects on hydropower generation can be as high as US$ 8 per year per ha deforested. We consider this as a conservative estimate of a permanent service provided by the rainforest. Policy makers and other Amazon agriculture and energy businesses must be aware of these numbers, and consider them while planning their activities.