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Forest-rainfall cascades buffer against drought across the Amazon

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Transpiration by trees in the Amazon enhances rainfall above downwind forests. However, until now it has been unclear how this cascading effect plays out across the basin. We calculated local forest transpiration and the subsequent trajectories of transpired water through the atmosphere in high spatial and temporal detail. We estimate that one-third of Amazon rainfall originates within its own basin, of which two-thirds has been transpired by trees. Forests in the southern half of the basin contribute most to the stability of other forests in this way, whereas forests in the south-western Amazon are particularly dependent on transpired-water subsidies. These forest-rainfall cascades buffer the effects of drought and reveal a mechanism by which deforestation can compromise the resilience of the Amazon forest system in the face of future climatic extremes.