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Ecohydrological impacts of tropical forest conversion to oil palm plantations

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The expansion of oil palm (OP) plantations in the tropics is causing significant losses of biodiversity-rich tropical forests but little is known on the impact of such land-use change on ecosystem-scale water, carbon, and energy fluxes. Model simulations constrained by field observations from seven sites in South East Asia are employed here to assess changes in evapotranspiration, gross primary production and local microclimate following forest conversion to large scale OP plantations. Simulation results show that the establishment of young OP plantations decrease evapotranspiration and increase surface temperature up to 3°C, while intensively managed mature plantations transpire more water (+7-8%) compared to tropical forests. This high water requirement is linked to physiological constrains on the water use efficiency of mature palms and their high fruit yield. Given the projected expansion of OP plantations, these results highlight the need to include water resources management in the debate for OP sustainability.