

# Irrigation Impacts in the Earth System: Much More Understanding Needed

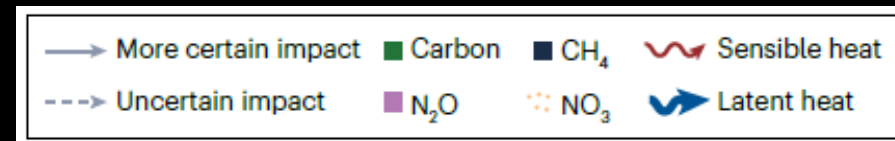
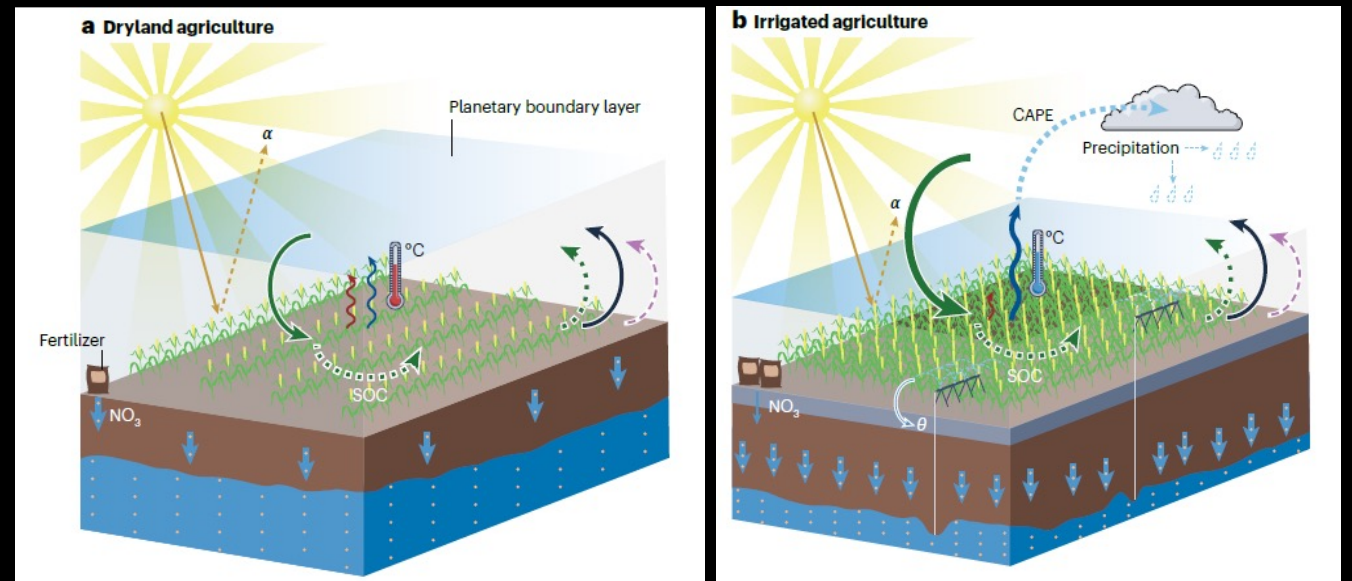


Irrigation accounts for ~70% of global freshwater withdrawals and ~90% of consumptive water use, driving myriad Earth system impacts. Estimates suggest there are more than 3.6 million square kilometers of currently irrigated land, with hot spots in the intensively cultivated U.S. High Plains, California Central Valley, and elsewhere in the world.

Major uncertainties and gaps remain in irrigation research and modeling. Irrigation could enhance cropland carbon uptake; however, it can also contribute to elevated methane fluxes in rice systems and mobilize nitrogen loading to groundwater.

Irrigation impacts weather and climate processes by altering surface energy and moisture balances, exchanges with the atmosphere and biogeochemical cycling. These irrigation–Earth system interactions have implications for a range of ecosystem services, such as crop production, carbon sequestration on agricultural lands, water availability and even human health.

Paper: [Irrigation in the Earth system | Nature Reviews Earth & Environment](#)



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