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Modelling the irrigation water demand through integration of irrigation scheme with NASA-Land Information System Framework (LISF) in India

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The current study provides the irrigation water estimate based on incorporation of satellite-derived irrigation scheme and crop datasets into the NASA-Land Information System Framework (LISF) in India. NOAH 3.3 land surface model within NASA-LISF was run at 0.05-degree resolution for nine years from 2011 to 2019. The irrigation scheme accurately captures the seasonality and the two growing seasons that is December-March and August-November. The MODIS leaf area index product helps to regulate the seasonality and estimated irrigation amount and timing is based on 50% depletion of soil moisture at the field capacity in the rootzone. The results show that the evapotranspiration (ET) and latent heat flux (LE) have increased significantly in the cropped region with improvement in correlation with the MODIS ET and LE products. The study also shows an improvement in soil moisture simulation at the test sites (Varanasi and Gujarat). Besides, successfully demonstrating the irrigation timing and quantity, the present study can also be relevant to hydrological and energy fluxes studies of areas that still lack proper quantification of agricultural practices utilizing irrigation.