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# Characterizing Palo Verde wetland's Vertisols hydrodynamics

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The hydrological regime of wetlands is considered the key driver of their ecological structure. Understanding the link between hydrological alteration and ecological degradation would support the definition of better wetland restoration and management programs.
The Palo Verde wetland (PV) in NW Costa Rica is internationally recognized under the Ramsar Convention for its unique fauna and flora. In the past decades it has experienced significant human-induced changes in its hydrological regime. We hypothesize these changes caused the spread of indigenous invasive species PV has undergone.
Palo Verde is a highly dynamic wetland. The area is flooded with a standing pool of water during the rainy season, while during the dry season, very large soil cracks indicate an advanced stage of desiccation. These processes generate very heterogeneous patterns. A shallow water table and sea water upwelling are some of the other factors driving soil variability at the wetland scale.
PV's Vertisol is the leading player of hydrological partitioning across space and time between infiltration, plant transpiration and pooling of water. Yet to this day a mechanistic model predicting saturated as well as unsaturated flow conditions in these soils is still lacking for PV. This is a consequence of the Vertisols swelling-shrinking properties, impeding the use of classical Richards equation for the simulation of Vertisols hydrodynamics. In addition, cracks and large variations in soil moisture impede the use of certain measurement devices. A preliminary matter is to consider these local environmental conditions and the soil's variability to design time-effective and adequate experimental approaches.
In this study, together through a literature review of experimental designs for Vertisols hydrodynamics characterization and an analysis of previous studies of Palo Verde soil's physics and soil moisture time series we suggest a methodological approach to elucidate the temporal dynamics of infiltration in PV wetland.