



## **Water and salinity interactions between groundwater, rootzone, vegetation and climate**

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Ecohydrological research on the water balance has given little consideration to the replenishment of rootzone water by capillary upflow from groundwater. Depending on climate, vegetation, soil, and ground water parameters, such upflow can be important. Hence, a model approach to quantify this aspect is developed, after making a comparison of alternative ways to quantify capillary upflow. The rootzone water balance model accounts for evapotranspiration and rainfall, leaching and capillary upflow, and assumes a Poisson distributed rainfall. Analytical solutions for the rootzone probability density function of water saturation can be derived. The selected upflow model is used to underline the importance of a dimorphic root architecture and major unknown properties that deserve attention in research, for in particular semi-arid regions. Since capillary upflow can not be considered independently from simultaneously occurring salt fluxes, the salt balance dynamics should be coupled with those of water. Important water & salt regimes are distinguished on the basis of long term sustainability and management options, with regard to the coupled flow and salt dynamics. Interestingly, it can be shown that different scales of temporal periodicity affect the long term as well as the spatial aspects of water and salinity interactions.