



## **MODELING SOIL-WATER DYNAMICS FOR DIVERSE ENVIRONMENTAL NEEDS**

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Accurate representation of the top soil matrix with special attention to the scales present is important to the dynamics of water flow and fate of pollution at field, farm and watershed scales. It is also important from an agronomic stand point since agriculture still constitutes the main source of pollution at a time when many agronomic models still use empirical notions of soil hydraulic properties. The soil dynamics literature describes soil hydraulic properties independently from the soil-water medium hydro-structural dynamics. This leads to an empirical approach to represent and estimate soil hydro-structural properties such as shrinkage, water potential, field capacity, available water, hydraulic conductivity, etc. This study presents a comprehensive conceptual and functional model of structured soil-water medium in which the thermodynamic equilibrium is characterized by its internal hydro-structural changes. The shrinkage curve will be used to represent and characterize the soil water medium equilibrium and the swelling curve will be used to represent the soil dynamics on its return to equilibrium.