

# EVALUATION OF PEDOTRANSFER FUNCTIONS WITH SMALL-SCALE SIMPLE FIELD MEASUREMENTS OF HYDRAULIC CONDUCTIVITY IN LAIKIPIA, KENYA

*Lory Willard, Rafael Muñoz-Carpena, and Cheryl Palm*

University of Florida, Gainesville, FL, USA

Understanding the hydrologic cycle on a small scale is necessary for water resources management and sustainable agricultural intensification in Kenya and across Africa. As a primary driver of the hydrologic cycle, hydraulic conductivity influences runoff, infiltration, and evapotranspiration, but field tests can be difficult to conduct in water-scarce communities. Soil datasets generated by the Africa Soil Information Service (AfSIS) and Food and Agriculture Organization (FAO) have been integral for enhancing modeling efforts across Africa due to a historical lack of data and the cost of field research. Since these datasets contain information such as bulk density and soil texture, they can be used to infer more complicated measurements, such as hydraulic conductivity, through pedotransfer functions. These databases often have low spatial resolution (>250 m) and are based on low sampling density and frequency. When using the datasets to parameterize hydrologic models, special errors can compound to limit the usability of the model as a research and management tool. Although field infiltration studies are generally costly, several field instruments, such as the mini-disk infiltrometer and modified Philip-Dunne permeameter (MPD), exist that allow for easier and inexpensive collection of hydraulic conductivity data. In this study, we compare hydraulic conductivity in agricultural, pastoral, and bush landscapes in Laikipia County, Kenya observed using a mini-disk infiltrometer and MPD with those calculated using publicly available soil databases. Results were analyzed to determine if there is an optimal spatial scale to use soil databases versus field sampling. Understanding the limitations of the soils products as well as the potential effectiveness of “quick” field tests is necessary to continually improve water resources management in Kenya and across Africa through effective model development.

**PRESENTER BIO:** Lory is a graduate student in the Agricultural and Biological Engineering Department at UF. She received her bachelor's ('13) and master's ('14) degrees from the Biological Systems Engineering Department at Virginia Tech, and worked for several years in environmental consulting and local government.