



## **Measuring the Actual Evapotranspiration in arid regions using Smart Field Lysimeter (SFL)**

Husam Baalousha and Fanilo Ramasomanana

Hamad Bin Khalifa University (HBKU), Qatar Environment and Energy Research Institute (QEERI), Doha, Qatar  
(hbaalousha@qf.org.qa)

Actual evapotranspiration is a fundamental component in water balance, especially in arid regions. It is often calculated using empirical formulas for potential evaporation and estimated based on the available soil moisture contents.

The Smart Field Lysimeters (SFL) are cylinders installed in the ground containing undisturbed soil profiles, with data loggers fitted at various depths of the cylinder. The SFL is sitting on the top of a scale, and connected to a drainage water tank, which also sits on a scale. By recording the variation in the weights of both the cylinder and the water tank, drainage and evapotranspiration can be calculated. The data logger records weight data every minute, in addition to soil moisture, temperature and matric potential every 10 minutes.

Two lysimeters were installed in Doha, Qatar using undisturbed loamy soil profile. Data collected over the summer period between May and August. Temperature reaches its peak in this period, with no rainfall.

Interpretation of weights data shows actual evapotranspiration during the summer period in Doha varies between 0.1 and 0.15 mm per day. This data is very useful for water budget models, and soil moisture analysis, as it provided for the first time actual insight into daily evapotranspiration. SFL can also be used to calculate actual infiltration and recharge during the rainy season.

### **Acknowledgment**

This paper was made possible by NPRP grant # [NPRP 9-030-1-008] from the Qatar National Research Fund (a member of Qatar Foundation). The findings achieved herein are solely the responsibility of the author[s].”