

# Design, Construction And Testing Of A Drainage Lysimeter

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A drainage lysimeter of  $2\text{m} \times 1.6\text{m}$  surface area with a depth of  $1.7\text{m}$  was designed, constructed, and tested. The materials for construction were  $2\text{mm}$  (thick) metal sheets, soil pebbles/gravel and stones. The lysimeter was tested, by using it to estimate the crop evapotranspiration of African spinach (*Amaranthus Cruentus*) in Nsukka in Southeastern Nigeria, using the water balance equation. The crop was irrigated daily using a watering can, and the lysimeter was use to monitor rainfall, drainage, and soil moisture. The daily data generated were used to calculate crop evapotranspiration (ETc Lysimeter) from the water balance equation from mid February and to March 2011. Climatic data obtained for the same period were processed to evaluate ETc using the FAO Penman Monteith (ETc PM) method. Also pan evaporation measurements made during the period were used to obtain crop evapotranspiration (ETc Pan) by the Pan Evaporation method. The crop evapotranspiration from the lysimeter (ETc Lysimeter) was found to be a total of  $185.37\text{mm}$ , while that of Penman Monteith (ETc PM) and pan evaporation (ETc Pan)

were 188.56mm and 143.12mm respectively. The difference between lysimeter ET<sub>c</sub> value and the value obtained by the FAO Penman Monteith method was quite insignificant statistically while that between Pan Evaporation and Lysimeter methods were found to be statistically different at 5% level of significance. Improper placement of the evaporation pan, and lack of screening to shield birds and rodents from the pan, may compromise ET<sub>c</sub> values by the Pan Evaporation method.