A LYSIMETRIC STUDY OF EVAPOTRANSPIRATION OF
NSUKKA YELLOW PEPPER, NSUKKA, NIGERIA

BY

OGBU, NGOZI ADAEZE
PG/M.ENG./03/35147

A PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENT FOR THE AWARD OF MASTERS
DEGREE (M. ENG.) IN AGRICULTURAL AND BIORESOURCES
ENGINEERING

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UNIVERSITY OF NIGERIA, NSUKKA

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TO GOD, MY EL ELOHE
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ABSTRACT

A lysimeter consists of a block of soil in a field isolated from its surrounding by a casing. Water percolating through the soil is collected by a receiving container to a drain at the bottom of the block. Lysimeters are used to measure crop evapotranspiration which is important in agriculture for scheduling, designing and managing irrigation and drainage systems. An existing 2.0 m x 1.64 m x 1.7m drainage lysimeter installed at the experimental plot of the Agricultural and Bioresources Engineering Department, University of Nigeria, Nsukka (UNN) was used to study the evapotranspiration of an indigenous crop known as “Nsukka Yellow pepper” (*capsicum* spp). Using a watering can, the crop in and around the lysimeter was irrigated daily to augment rainfall. Drainage, irrigation, rainfall, soil moisture and evaporation were monitored. From the volumetric water balance equation, the daily data generated were used to calculate the crop evapotranspiration from the lysimeter from May ending to mid-August 2011. Climatic data for the same period were inputted in the FAO Penman-Monteith (PM) equation using CROPWAT model to determine the reference evapotranspiration. The daily crop coefficient values for Nsukka yellow pepper were determined by dividing the daily crop evapotranspiration values estimated from the lysimeter with the corresponding values of the daily reference evapotranspiration evaluated from the FAO PM method. The daily crop coefficient values for Nsukka Yellow pepper computed were used to determine daily crop evapotranspiration for Pan and modified Hargreaves methods. Each of the crop evapotranspiration for the lysimeter (ET$_c$ Lys) and FAO PM was found to be a total of 165.11 mm for the duration of study. The corresponding crop evapotranspiration for Pan and modified Hargreaves methods were 111.47 mm and 142.19 mm, respectively, for the same crop and period of study.
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