PERFORMANCE EVALUATION OF EMPIRICAL BASED REFERENCE
EVAPOTRANSPIRATION MODELS IN THE SAHEL SAVANNA
AND MONTANE SAVANNA OF NIGERIA

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ABSTRACT
The road map for agricultural crop development, irrigation scheduling and water management lies squarely on the knowledge and application of evapotranspiration. It is the central tenet in combating hunger and eradicating food security challenges. The research evaluates the performance of four empirical reference evapotranspiration (ET0) models among them the modified Caprio reference evapotranspiration (ET0) model. Four empirical models were used to evaluate the performance of reference evapotranspiration in the Sahel and Montane savanna of Nigeria to address the challenges of desertification, drought, as well as provide solution on reforestation process of the already degraded green vegetation through the knowledge and application of consumptive water use. The modified Caprio presented better performance evaluation result among the four empirical models, which shows that modifying the local empirical coefficient forms the bases for regional determination of ETo within the climate regime for proper crop productivity. The modified Caprio ETo model provided a more standard result than the other empirical models when compared with the standard table of Allen for various agro – climate regions other than using the FAO 56 Penman – Monteith model. Empirical models have formed the bases for the estimation, comparison, evaluation and the performance of evapotranspiration in the developing world. Hence, the modification proves the variability and transferability of the empirical coefficient for adaptability to different regions and climates regimes.

Keywords: Agricultural crop development, Food security challenge, Nigeria, Sahel-Savanna Montane, Temperature-based ET.
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