

COMPARISON OF METHODS FOR ESTIMATING REFERENCE EVAPOTRANSPIRATION (ET_0) OF RICE CROP IN BHUBANESWAR REGION OF ODISHA

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ABSTRACT

A field experiment was conducted at Central Research Farm, OUAT, Bhubaneswar on rice grown in Rabi, 2015 with two soil moisture regimes (flooding and aerobic) and four cultivars of various maturity duration. Daily Meteorological data of OUAT observatory during the crop season January to May, 2015, were used in estimating the ET_0 using 15 empirical models. The objective of the work was to estimate the ET_0 rates using different empirical methods and compare with the estimated ET_0 with open pan evaporation and crop transpiration. As per estimated ET_0 in January, Turc method did not correlate with Businger-van-Bavel, FAO-24 and Christiansen methods. Pan Evaporation was correlated with estimated ET_0 by Penman-Monteith, Hargreaves, Turc, Priestly-Taylor and FAO-56 methods. For the month of February, the estimated ET_0 highly correlated among all the methods as well as with pan evaporation. For the month of March pan evaporation correlated only with Kimberly-Penman, Penman 1963, FAO-24 Penman and Christiansen methods. For the month of April and May, pan evaporation correlated well with estimated ET by FAO 24 and Christiansen method. For the season as whole, all the methods except Christiansen method were correlated with the pan evaporation. Regression analysis showed that pan evaporation could be estimated by different methods for different months. For the month of January, five methods namely Penman-Monteith, Turc, Priestly Taylor and FAO-56 Penman-Monteith estimated the pan evaporation with R^2 ranging for 0.193 to 0.688. February pan evaporation could be estimated by any of the 15 methods. However, for the month of March, April and May, only two methods, namely FAO 24 and Christiansen were useful in estimating pan evaporation. On the other hand, for the season as a whole, these two methods were unable to estimate the pan evaporation rate. Transpiration was more under the continuous flooding than under the aerobic. Cultiver Naveen recorded highest transpiration rate, while Khandagiri recorded the lowest transpiration rate both at flowering and physiological maturity. Transpiration rate was highest in maturity stage ($1.4 \times 10^{-3} \mu\text{moles m}^{-2} \text{sec}^{-1}$) than the flowering stage ($1.0 \times 10^{-3} \mu\text{moles m}^{-2} \text{sec}^{-1}$).

KEYWORDS: Reference Evapotranspiration (ET_0), Fao-56 Penman Monteith, Turc, Fao 24 Penman, Priestly Taylor