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Suitability of Pan estimated PET and ET_o by Modified Penman method to DL $_{1b}$ agro- ecological zone in Sri Lanka

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A reasonable estimate of potential evapotranspiration of a particular agro ecological environment is a prerequisite for efficient management of irrigation water. In Sri Lanka, estimation of crop water requirements and irrigation scheduling are done based on estimates of potential evapotranspiration values based on pan method.

The FAO Penman-Monteith method is recommended as the sole standard method to estimate reference evapotranspiration (ET_0). It is a method with strong likelihood of correctly predicting ET_o in a wide range of locations and climates. Monthly average maximum temperatures, minimum temperatures, relative humidity, bright sunshine hours and wind velocity values collected during the period of 1976-2004, at Maha Illuppallama meteorological station was used for a study where ET_0 was calculated using the Penman Monteith equation using the Cropwat 4 windows Ver 4.3 software. The Penman Monteith (ET_0) values were compared with potential evapotranspiration (PET) values and modified Penman ET_0 values of above meteorological station to check the suitability of these two methods for DL $_{1b}$.

The calculated reference evapotranspiration values by all three methods show the similar pattern throughout the year. Three methods have quantitative difference of ET_0 values. However none of the methods showed a significant difference on reference evapotranspiration values under the experiment. The Penman-Monteith approach shows relatively accurate and consistent performance. There is lower estimation of ET_0 values in pan evaporation method because it influenced by pan surrounding, fetch, relative humidity, and wind speed. The modified Penman method shows the higher estimation that uses average recent data for about five years of its calculations. Reference evapotranspiration at Maha Illuppallama exhibits a temporal variability. The lowest ET_0 values occur in December, while the highest ET_0 in March according to three methods.

It is recommended to use Penman-Monteith ET_o values in any future works such as determining crop water requirement, irrigation scheduling, as input for yield modeling or any other agricultural planning activity.

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