

ABSTRACT

This study examined the irrigation requirements of selected crops - grain corn, sweet corn, soyabean, tomato, small vegetables and pasture grass on different soil types employing climatological methods of analysis. Thirty-nine soil series of different texture, relief and lithology, belonging to all the eight soil taxonomic orders have been considered on principles of land capability and existing land use. The aim of the study was to choose and recommend a reasonably good method of estimating irrigation requirements under Trinidad climatic and soil conditions.

Irrigation requirement was calculated as the difference between consumptive use and effective rainfall and the meteorological and soils data used were provided by the Department of Soil Science, U.W.I., St. Augustine, Trinidad.

Consumptive use was estimated with the empirical and semi-empirical meteorological methods of Holdridge, Thornthwaite, Blaney-Criddle and Penman. It was also estimated from the improved versions of Blaney-Criddle, Radiation and Penman methods. The estimated values of consumptive use were compared with lysimetrically measured values over 13 years (1955-67). It has been found that the Blaney-Criddle method, in its original form, is acceptable for the months December to April (and Holdridge method for the remaining months of the year, based on the criteria of reasonably precise estimates based on χ^2 test.

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Although the individual methods of Penman and Improved Radiation gave more precise estimates for some individual months, they are not recommended for adoption in routine use with a thrust on simplicity in computations. For the same reasons, though the feasibility of further improving Blaney-Criddle's modified method dispensing with K_c values was examined, and new a and b values found which could be statistically more precise in estimations for February and March, it has not been recommended. The accuracy in estimations of consumptive use is up to 90 per cent adopting Blaney-Criddle (original) method, in dry season, when irrigation is mostly needed.

Irrigation requirements (y) plotted against effective rainfall (x) are found to decrease in a straight line regression an effective rainfall increases irrespective of the soil type.

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