



IV CONGRESO NACIONAL DE RIEGO Y DRENAJE COMEII 2018

Aguascalientes, Ags., del 15 al 18 de octubre de 2018

ESTIMATION OF PEAK IRRIGATION REQUIREMENTS FOR DESIGN PURPOSES AFFECTED BY THE TYPE OF IRRIGATION SYSTEM

(LA ESTIMACIÓN DE LOS REQUERIMIENTOS PICO DE RIEGO CON FINES DE DISEÑO
AFECTADO POR EL TIPO DE SISTEMA DE RIEGO)

Waldo Ojeda Bustamante^{1*}; Rocio Guadalupe Reyes Esteves²

¹Coordinación de Riego y Drenaje. Instituto Mexicano de Tecnología del Agua. Paseo Cuauhnáhuac 8532, Progreso, Jiutepec, Morelos, C.P. 62550. México.

E-mail: wojeda@tlaloc.imta.mx (*Corresponding author)

²University of Arizona, Department of Biosystems Engineering. 1177 E. 4th Street, Shantz Building, Room 609. Tucson, AZ, USA 85721.

Abstract

A key variable in an irrigation system design is estimation of the amount of water to be applied through the crop cycle. Specifically, what is the peak demand required to design a water network for critical conditions. Insufficient knowledge of crop water needs can produce an over-design of the network with unnecessary costs or under-design of the network resulting in the inability to satisfy maximum crop water demands. Different irrigation systems must supply water in quantities and at times needed to meet irrigation requirements and schedules. The study's objective was to analyze the effect of the irrigation system on the estimation of the maximum irrigation requirements as well as the impact of the precipitation for design purposes. The Design Daily Irrigation Requirements (DDIR) were determined from several years of daily irrigation requirement (DIR) data. DIR's for each year of climatic record were computed with the software CROPWAT 8.0. A frequency analysis of thirty years of DDIR values was made to account for year-to-year fluctuations in climate. Such analysis allows a probability of occurrence to be assigned to each DDIR. The results showed that the frequency analysis allows identification of a DDIR that will, on average, be exceeded 50, 20, 10, and 5 percent of the time (return periods of 2, 5, 10 and 20 years respectively) to be determined. For example, a 5-year return period indicates that historically, the DDIR has been exceeded once in 5 years.

Keywords: Design Daily Irrigation Requirement (DDIR), irrigation scheduling, frequency analysis, CROPWAT 8.0.