Evaluating the Accuracy of Revised USDA-NRCS Method in Estimating Infiltration Parameters in Amir Kabir Agro Industrial Fields' Furrow Irrigation Systems

M. Ghahremannejad[1*], S. Boroomandnasab[1], M. Behzad[1], A.A Naseri[1] and A. Sheini Dashtgol[2]

(Received: May 4-2012 ; Accepted : Jan. 19-2014)

Abstract

Infiltration is the most crucial process affecting surface irrigation uniformity and efficiency as it is the mechanism that transfers and distributes water from the surface to the soil profile. As a direct method of infiltration measurement, the volume balance method requires time, accuracy and high costs. Moreover, before the land preparation and at the research phase the use of this method is not feasible. The revised USDA- NRCS method is used to convert the infiltration parameters to different hydraulic conditions. In this study, the accuracy of the original and revised USDA-NRCS method in the estimation of furrow irrigation infiltration parameters in Amir Kabir Agro Industrial sugarcane fields of Ahvaz was evaluated. For this purpose, infiltration parameters and the cumulative 6 hour infiltration for furrow irrigation systems of this region were estimated using four methods of original USDA- NRCS, revised USDA- NRCS for border irrigation, revised USDA- NRCS for furrow irrigation and field measurement (inflow-outflow). For evaluation of the results, four indices including average prediction error of model (Er), distribution into 45° line (λ), determination coefficient (R^2) and average relative error of model (Ea) were used. According to the results, the revised USDA- NRCS method for border irrigation with average values of λ, R^2, Er and Ea equal to 0.95, 97, 6.5 and 7.6 percent, respectively was the best estimate of cumulative infiltration.

Keywords: Infiltration equation, Double ring experiment, Inflow-outflow method, Hydraulic condition

[Downloaded from jstnar.iut.ac.ir on 2024-04-24]

[DOR: 20.1001.1.24763594.1393.18.70.7.6]

1. Dept .of Irrigation and Drainage, College of Water Sci. Eng., Shahid Chamran Univ., Ahwaz, Iran.
2. Sugarcane Research and Training Development, Khuzestan, Iran
*: Corresponding Author Email: m.gahraman@gmail.com