Water productivity and crop production simulation under surge flow irrigation in short furrows in Egypt


Abstract:

This paper describes the simulation results of water productivity and yield production in relation to water supply by either continuous or surge flow irrigation in short fields for clay and sandy soils in Egypt. The input data required by the Cropwat model are meteorological data, plant and soil characteristics and water supply. The meteorological data for the year 1999 were obtained from the Assiut Station, Egypt. Cotton was used as the most important crop for the simulation and its growing characteristics come from the Cropwat model. Soil characteristics and water supply are measured data obtained from field experiments in Assiut. During the simulation all the parameters considered have been kept constant except for the water supply and application efficiency, which are variable. The yield has been determined with Cropwat at the beginning, middle and the end of a furrow as well as for the average stored water depth along the whole furrow. The simulation has been carried out for two different approaches; one based on optimal continuous flow and the other based on optimal surge flow irrigation. The simulation indicates that using an optimal surge flow gives higher crop yields than using an optimal continuous flow. For optimal surge flow irrigation the simulation revealed distinct differences in yield reduction between continuous and surge flow irrigation compared to the results based on optimal continuous flow. Surge flow irrigation is an efficient tool either to produce the same yield with less water than in continuous flow or to produce higher yields than continuous flow by using the same gross irrigation supply. Surge flow irrigation is an effective tool for water saving in short fields as prevails in Egypt. Copyright # 2005 John Wiley & Sons, Ltd.

Published In:

Irrigation and Drainage Journal, Vol. 54 - No. 1, pp. 103-113