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Water, soil and fertilizer saving using modified increased discharge for furrow irrigation

B. Moravejalahkami

Isfahan University of Technology, Iran

Abstract

The performance of furrow irrigation system as one of the surface irrigation methods can be improved through optimal management practices such as selection of proper inflow rates and cut-off times. In this study, the effect of modified increased discharge on water and fertilizer use saving and soil erosion was investigated under actual field conditions. To apply the modified increased discharge an automatic device was designed and used in the field. The applied volume of water and total fertilizer mass were the same for all of the experiments. The field results showed irrigation water saving of 16.87% and fertilizer loss due to runoff decreased 34.7%. Tailwater runoff decreased 68% for modified increased discharge that could decrease soil erosion in furrow irrigation. The performance of a zero- inertia model for the application of modified increased discharge under different field slopes and furrow lengths showed that the irrigation water saving became higher under higher field slopes and lower furrow lengths. The proper management of furrow irrigation can significantly reduce water use, soil erosion, fertilizer losses and consequently water resource pollution.

Keywords: Furrow irrigation, water saving, fertigation, tailwater runoff