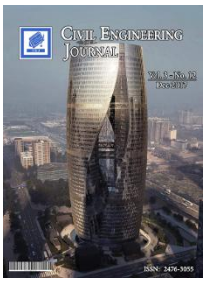
Available online at www.CivileJournal.org

Civil Engineering Journal

Vol. 3, No. 12, December, 2017



Changing Furrow Irrigation to Increase Efficiency and Feasibility Study of Reusing Surface Runoff

Ehsan Dayer [a], Ebrahim pazira [b*], Heydar Ali Kashkuli [c], Hossein Sedghi [a]

[a] *Department of Water Sciences and Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran .*

[b] *Department of Soil Science, Science and Research Branch, Islamic Azad University, Tehran, Iran.*

[c] *Department of Water Sciences and Engineering, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran.*

Received 03 October 2017; Accepted 21 December 2017

Abstract

To improve irrigation techniques and the utilization of available water resources in Iran, a first steps re evaluation of traditional irrigation methods. To assess the efficiency of furrow irrigation, a 4-ha plot (87 furrows) cultivated with sugarcane was evaluated in Khuzestan Province. The quantities of inflow, outflow runoff, soil moisture before irrigation, depth of root development and depth of water infiltration were measured and thus the values of water use efficiency, uniformity coefficient, and distribution uniformity were determined for the selected plot. Using Geographical Information System, in ArcView, the irrigation efficiency of its levels were analyzed using two furrow irrigation methods: open and closed-end. The results showed that the irrigation efficiency, uniformity coefficient and distribution uniformity for the open-end than the closed-end method. The prevention of deep infiltration losses (approximately 30% lower than for closed-end) and allowing outflow of end runoff, and depending on water quality, the riffle can be considered ideal for irrigating other surfaces.

Keywords: ArcView GIS Software; Closed-End Furrow Irrigation; Open-End Furrow Irrigation; Tail Water Quality.

1. Introduction

Water scarcity in most developing countries imposes a large economic burden on governments, and efficient use of irrigation water is considered a top priority to conserve this resource. Due to the limited atmospheric precipitation and lack of appropriate spatial and temporal distribution, is classified as an arid and semi-arid country. However, a rapidly growing population, urbanization, and development of both economic and agricultural areas have increased demands for water resources. One of the most important elements of water resources management is predicting future availability of these resources [1].

In Iran, the gap between supply and demand for water is increasing with time. By considering this major challenge, the rational utilization of available water resources in all applications is particularly important for agriculture as the major consumer of water (92%). Therefore, the government must adopt policies focused on the economical utilization of water and persuade farmers to consume water as efficiently as possible. Increasing the efficiency of irrigation is considered an efficient solution to the current problem and also leads to enhancement of the irrigated farming area.

Due to having the most suitable soil and water resources, Khuzestan Province has the potential for cultivating both tropical and sub-tropical plants. Sugarcane was one of the first crops widely cultivated in this province. Now, in addition to Haft Tappeh Sugarcane Agro-Industry Co, Karun and MianAb, other companies are actively engaging in producing

* Corresponding author: ebrahimpazira@gmail.com

http://dx.doi.org/10.28991/cej-030957