

Wheat Water Productivity Analysis under Different Irrigation Management Practices in Some Regions of Iran

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Abstract

Recently, the main challenge of agricultural sector is improvement of crop water productivity (CWP). In Iran, unfortunately up to now, determination and analysis of water productivity indicators in agricultural sector has not been considered seriously, which has led to the uncertainty of proper water consumption in agriculture. This study was aimed to evaluate wheat water productivity under different irrigation managements in Iran and determine the suitable irrigation depth for wheat in situation of water resource limitations. Based on the experiments conducted in eight research stations located in different regions of the country during 1998-2012 for wheat, it was found that the range of CWP was 0.3-1.5 kg m⁻³ which was wider than that reported earlier by the FAO, i.e. 0.8-1.0 kg m⁻³. Nevertheless, it is in the range proposed by Zwart and Bastiaanssen in 13 countries from five different continents. The wide ranges of CWP indicate tremendous opportunities for increasing the agricultural productions with less water. The maximum measured wheat water productivity (CWP_I) for irrigation water alone and for irrigation+effective rainfall (CWP_{I+Re}) was 2.1 and 1.5 kg m⁻³, respectively, in Karaj region, where drip irrigation and deficit irrigation management were applied. Also, the minimum measured wheat CWP_I and CWP_{I+Re} was observed in Kerman region under surface irrigation. The maximum measured wheat CWP_I and CWP_{I+Re} in Mashhad region was 1.9 and 1.5 kg m⁻³, respectively, under deficit irrigation management. The results showed that wheat CWP_I and CWP_{I+Re} of 1.6 and 1.1 kg m⁻³ could be considered as the optimum levels in cropping system of Mashhad region. The depths of irrigation water alone and total applied water (irrigation +effective rainfall) for optimum level of wheat CWP under deficit irrigation management were 300 and 420 mm, respectively.

Keywords: Effective rainfall, Deficit irrigation, Suitable irrigation depth, WUE.

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