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Determination of Optimum Water Consumptive Using Deficit Irrigation Model for Barely: A Case Study in Arak, Iran

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Abstract : This research was carried out in five fields (5-15 hectares) in Arak located in center of Iran, to determine optimum level of water consumed for Barely in four stages growth (vegetative, yield formation, flowering, and ripening). Actual evapotranspiration was calculated using measured water requirement in the fields. Five levels of water requirement equal to 50, 60, 70, 80, and 90 percents formed the treatments. To determine the optimum level of water requirement linear programming was used. The study showed 60 percent water requirement (40 percent deficit irrigation) has been the optimum level of irrigation for winter wheat in four stages of growth. Comparison between all of the treatments indicated above with normal condition (100% water requirement) shows increasing in water use efficiency. Although 40% deficit irrigation treatment lead to decrease of 38% in yield, net benefit was increasing in 11.37%. Furthermore, in comparison with normal condition, 70% of water requirement increased water use efficiency as 30%.

Keywords : optimum, deficit irrigation, water use efficiency, evapotranspiration
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