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THE POTENTIAL OF USING A NEW AGRICULTURAL SYSTEM FOR IMPROVING WATER PRODUCTIVITY OF WHEAT

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ABSTRACT Wheat is one of the preeminent cereal crops in the world; it supplies much of the world's dietary protein and food supply, especially in Egypt, because it is the main source of food. In the last few decades, there has been a great interest from scientists and researchers to explore new agricultural systems in order to increase crop yield and water productivity, save irrigation water, decrease the risk and the associated hazards of late wheat cultivation, and to avoid early harvest of long season crops that precede wheat season. In addition, taking advantage of cultivating a short season crop between summer and winter seasons such as Egyptian clover, vegetables, fodder crops...etc. This study was carried out at Enshas Experiment Station, Water Management Research Institute, Sharkiya, Egypt. The study mainly aimed to investigate the possibility of transplanting wheat as a new agricultural system and its impact on water use, crop yield, and water productivity compared with the traditional sowing method. Three treatments of plant populations (4, 6, and 8 rows/bed) (T1, T2, and T3), respectively, were applied with both planting methods. Both wheat nursery and treatments of traditional method were planted on November 15. But the transplanting treatments were planted on January 15, two months late. The preliminary results revealed that the transplanting method saved 21% of total water applied compared with the traditional method. On the other hand, crop yields were 5.0, 5.7, and 7.1 t/ha and 3.7, 4.7, and 5.0 t/ha for T1, T2, and T3 with new and traditional planting methods, respectively. Crop water productivity (CWP) of the transplanting method was greater than the traditional method by 3.82% for T2. On the contrary, CWP of the traditional method was higher than the transplanting method by 4.8 and 10.9% for T1 and T2, respectively. It was noted that the inconsistent trend of CWP for both transplanting and traditional methods was due to the lack of experienced laborers for transplanting wheat.

Keywords: Egypt, Modified surface irrigation, Planting methods, Plant population, Raised bed, Sowing, Transplanting, Water use efficiency.