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Hydraulic performance analysis of the impacts of different farming systerms on agricultural pumping stations

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Abstract

Agricultural water pumping stations are one of the most important parts of an irrigation system in which any inefficiency will lead to a decrease in the overall efficiency of the complex. On the other hand, the operation of pumping stations is affected by the water transmission network as well as the agricultural exploitation system defined at the place of consumption. Therefore, any change in the irrigation system or crop operation system can affect the operation of the pumping station and take it out of the optimal mode of operation and energy consumption. Zahak-2 agricultural water pumping station, which is one of the set of water pumping stations in the project of transferring water through pipes to 46,000 hectares of agricultural lands in Sistan plain, is responsible for supplying water to the lands of district 2 of Zahak city, whose agricultural system is small-sized. Flood irrigation method is used to irrigate various cultivation patterns. In the present study, due to the pressure on the water transmission system and public reports of improper operation of the pumping station in meeting their needs, the effect of land consolidation for the ship and the centralized use of water to reduce pressure on the water transmission system and increase The performance of the pumping station is evaluated and analyzed. For this purpose, using WaterGems software, the pumping station and water transmission lines of the study area were simulated and the hypothesis was analyzed and evaluated based on various scenarios of change in the method of dewatering from the transmission system at the agricultural land.

Keywords: Hydroulic analysis, Water distribution network, Pump performance, Sistan Plain