

Evaluation of Performance of Qanats and Irrigation in Their Downstream Lands in Semnan Province

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Abstract

Qanat is one of the most surprising structures that is used for extraction of underground water in arid and semi-arid regions. There are 607 qanats in Semnan province, providing a total discharge of 93.5 million m³ of water per year. In this research, existing conditions and irrigation in agricultural fields of 15 qanats of Semnan province were studied and some executive strategies were recommended to improve qanats' performance. , quantity and quality changes of qanat water, application efficiency and water productivity downstream the studied qanats were evaluated. Results showed that insufficient credit, tunnel and wells collapsing due to lack of necessary construction and resistant covering, entrance of flood into qanats, numerous owners and rural migration were the most important reasons of discharge reduction and qanats destruction. Variations of EC and pH in qanats water were relatively low for a long period of time. Average of application efficiency in cultivated lands downstream the studied qanats was about 51.6%. Whereas it was 45.5% downstream the studied wells in the same regions. Average water productivity for various crops was 0.63 kg/m³. Establishment of strong groups to better partnership of owners in operation and maintenance of qanats, regular dredging, tunnel staining, well covering, tunnel tubing and fixing valve in qanat outlet, construction of qanat water reservoir and establishment of proportion between crops water requirement and amount of irrigation water in downstream lands of qanats are the most important practical strategies for improving qanats conditions.

Keywords: Irrigation Efficiency, Water Productivity, Technical and Operational Issues.

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