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Energy requirements in pressure irrigation systems

R. Sánchez (1), L. Rodríguez-Sinobas (1), L. Juana (1), F. V. Laguna (2), G. Castañón (1), M. Gil (1), and J. Benítez (1)

(1) Technical University of Madrid (UPM), Irrigation Hydraulics Research Group, Rural Eng. Dept., (2) Technical University of Madrid (UPM), Irrigation Hydraulics Research Group, Dept. of Civil Eng.:Hydraulics and Energy

Modernization of irrigation schemes, generally understood as transformation of surface irrigation systems into pressure –sprinkler and trickle- irrigation systems, aims at, among others, improving irrigation efficiency and reduction of operation and maintenance efforts made by the irrigators. However, pressure irrigation systems, in contrast, carry a serious energy cost. Energy requirements depend on decisions taken on management strategies during the operation phase, which are conditioned by previous decisions taken on the design project of the different elements which compose the irrigation system. Most of the countries where irrigation activity is significant bear in mind that modernization irrigation must play a key role in the agricultural infrastructure policies.
The objective of this study is to characterize and estimate the mean and variation of the energy consumed by common types of irrigation systems and their management possibilities. The work includes all processes involved from the diversion of water into irrigation specific infrastructure to water discharge by the emitters installed on the crop fields.
Simulation taking into account all elements comprising the irrigation system has been used to estimate the energy requirements of typical irrigation systems of several crop production systems. It has been applied to extensive and intensive crop systems, such us extensive winter crops, summer crops and olive trees, fruit trees and vineyards and intensive horticulture in greenhouses. The simulation of various types of irrigation systems and management strategies, in the framework imposed by particular cropping systems, would help to develop criteria for improving the energy balance in relation to the irrigation water supply productivity.