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ASSESSMENT OF HYDROLOGIC IMPACTS OF IRRIGATION PROJECTS IN A FLATLAND AREA, SANTA FE, ARGENTINA

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ABSTRACT

An analysis of the effects of a hypothetical intensive irrigation in the Ludueña Basin, Santa Fe, Argentina, is presented. The vertical flux of water and vapor is modeled for an extended period of time to assess long-term effects. Synthetic precipitation and evapotranspiration series were constructed with similar statistical properties to those observed in the study region. Daily values of evapotranspiration (7300 values) and hourly hyetographs were generated, including 1293 rain events over a twenty year period. Different simulation scenarios were used: a) the current scenario with extensive agriculture and no irrigation was taken as the reference and b) hypothetical intensive irrigation scenarios. These were divided into three variants: irrigation for maintenance of 60 percent, 75 percent and 90 percent of field capacity. The maximum irrigation scenario causes important changes. There is an increase of 7 percent for evapotranspiration, an increase in direct runoff, and a significant increase in recharge to the phreatic aquifer, which is shown to be the main impact of intensive irrigation. From a statistical point of view, the maximum runoff does not show big changes, but there is a very remarkable increase in the frequencies of high moisture and percolation processes in the soil profile.

Reference: Zimmermann, E. D.; Assessment of Hydrologic Impacts of Irrigation Projects in a Flatland Area, Santa Fe, Argentina, Journal of Environmental Hydrology, Vol. 7, Paper 1, January 1999.

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