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**MULTI-DECADAL ANALYSIS OF IRRIGATED ACREAGE IN  
THE LOWER RIO GRANDE VALLEY, NEW MEXICO**

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**ABSTRACT:** Working with the New Mexico Office of the State Engineer and the New Mexico Interstate Stream Commission, INTERA developed a time series of estimates of irrigated acreage within the Lower Rio Grande (LRG) valley from the 1970s to present day. The objective of the project was to develop an independent, accurate, and scientifically-justifiable evaluation of irrigated acreage in the region for the period spanning from the mid-1970s to the present. These acreage estimates were used in support of groundwater modeling of the Lower Rio Grande region, as well as for other analyses. Specific objectives of this project included using a remote-sensing based (Landsat satellite imagery) methodology to evaluate overall irrigated acreage within the LRG and hand-digitizing orchards within the LRG from historical aerial photography to quantify spatial and temporal trends in pecan cultivation. To meet these objectives, we developed and applied a new methodology that involved the normalization of vegetation indices derived from satellite imagery to get a more accurate estimation of irrigated acreage across multiple time periods and multiple Landsat platforms. The normalization allows more accurate evaluation of vegetation index data that span several decades. An accuracy assessment of the methodology and results from this study was performed using field-collected crop data from the 2008 growing season. The comparisons with field data indicate that the accuracy of the remote-sensing based estimates of historical irrigated acreage are very good, with rates of false positives (areas identified as irrigated that are not truly irrigated) of only about 4%, and rates of false negatives (areas identified as not irrigated that are truly irrigated) in the range of 0.6% - 2.0%. The results of this study provide the most comprehensive and consistent historical analysis of irrigated acreage available using Landsat imagery.

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