**Abstract**

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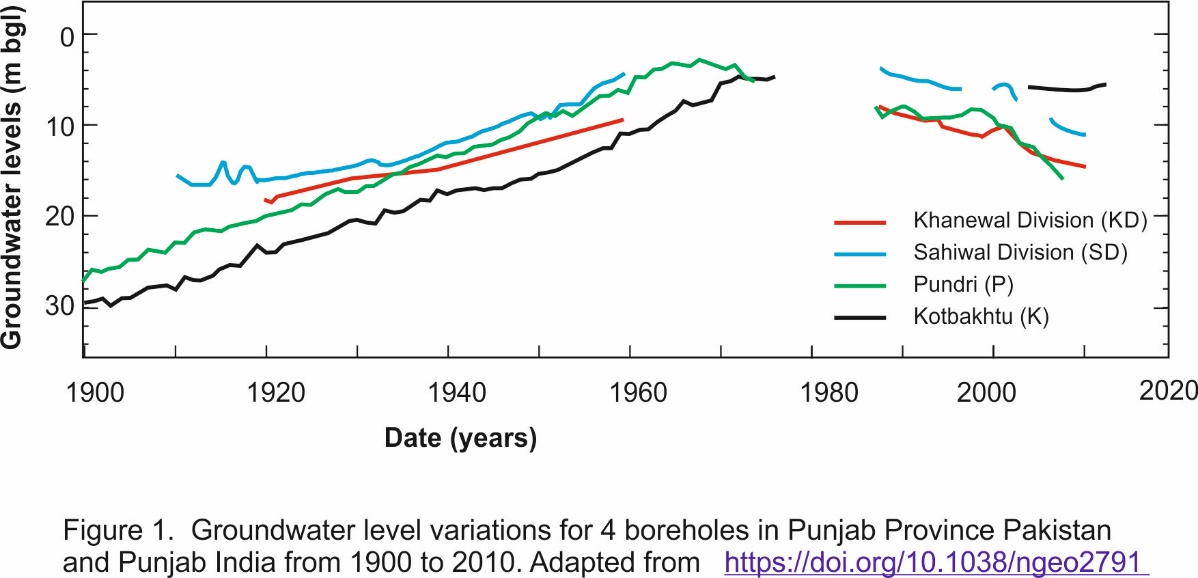
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Observed groundwater level decline in parts of Northern India and Pakistan have raised questions about the sustainability of current irrigation practices in the Indo Gangetic Plain. Recent studies using *insitu* groundwater level measurements and geochemical methods show a complex pattern of impacts from abstraction and recharge with a high degree of spatial variability. The areas of most concern for the aquifer are within the states of Punjab and Haryana in India and Punjab Province in Pakistan. Here groundwater levels can be 20 – 50 m below ground level and are falling at rates of 0.5 – 1 ma-1.

However, the recent depletion is set within a much longer history of groundwater level variations spanning the last 150 years. Here we have brought together approximately 50 long term hydrographs from northern India and Pakistan which give an unparalleled account of the accumulation of groundwater within the basin due to the widespread construction of canal systems in the Indus and Ganges in the 19th and early 20th centuries; the subsequent stabilization of groundwater levels attributed to state sponsored drilling and pumping to mitigate water-logging and salinization; and then the rise of private boreholes for irrigation in the 1980s and 90s. During the 1990s groundwater abstraction began to locally exceed surface water use for irrigation, and water levels began to fall rapidly is some areas. Currently, leakage from the irrigation canals is a vital source of recharge and any plans to improve efficiency of surface water irrigation will impact further on groundwater. Taking the long view of the patterns of past groundwater accumulation and depletion can therefore help to unravel the current complex pattern of groundwater level variation and water quality.

[](https://agu.confex.com/data/abstract/agu/19chapman5/4/2/Paper_487324_abstract_487019_0.jpg)