

## **Impact of Land-Use Change on Groundwater Resources: A Case Study from Beas-Satluj Interfluve Region of Punjab**

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Groundwater is not uniformly available everywhere. It is a natural resource generated over thousands of years. The economic race several times ignored protection of this natural wealth and exploited it unprecedentedly without looking for its future use. Such blind growth for quick profit has led to irreversible damage to this precious resource in the country which is continuously invading freshwater reserve zones and witnessing in the form of groundwater sink holes, water-logging, water pollution etc. Over the last 50 years since Green Revolution, economic status of Punjab grew multi-folds. Between 1951 to 2001 its population increased 2.65 times ( 9,160,500 in 1951 to 24,289,296 in 2001). The production of food grains increased from about 3 million tons in 1961 to 25.2 million tons in the year 2005-06. The net area irrigated increased from 2.02 Mha in the year 1960-61 to about 4.078 Mha by the end of 2006-07. But, as a result of reduced carrying capacity of the canal system (55% in 1960-61 to 29% in 2006-07) intensive groundwater extraction has taken place. In the last 35 years, shallow tubewells by individual farmers have increased by more than 5 times. This has resulted into continuous decline in groundwater table forcing farmers to bore the pumps further deeper in the wells, increasing the costs of pumping and energy use, thus decreasing profitability and efficiency of agriculture. Increasing food prices, farmers committing suicides, starvation for food is pressurizing government to take steps for the second green revolution. Although economic growth is witnessed through large scale infrastructure developments, it is also paving its way in to the groundwater recharge zones. Therefore, it is the need of the time to analyze the groundwater reserve for its sustained use to keep economic growth of the country steadily without any risk. In the present study a holistic approach is made to understand the groundwater system spread in the interfluve of Beas-Satluj region. The region is spread over 9000 km<sup>2</sup> and covers 18% of the Punjab state. Groundwater flow pattern, draft and recharge have been examined. Isotopic techniques have been used to map recharge zones and recharge sources and remedial measures have been explored towards sustainability of groundwater resources.

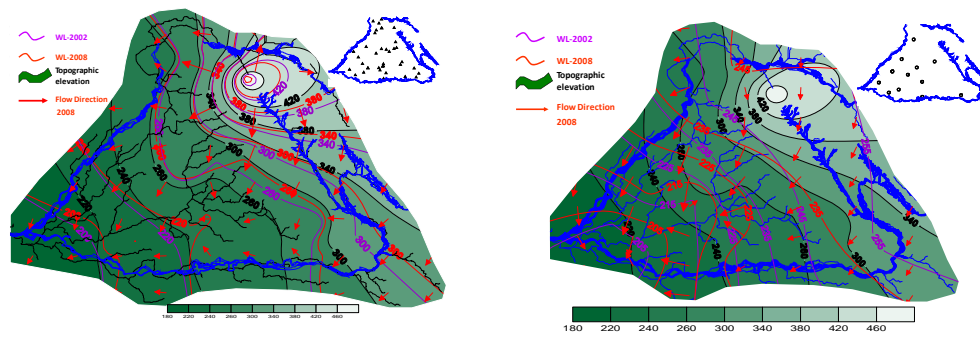


Figure 1. : Contours of depth to water-table with groundwater flow directions.

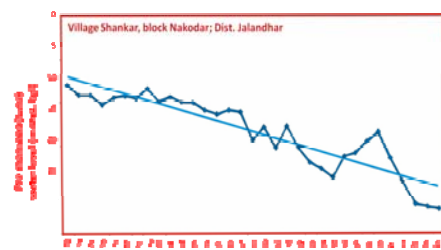


Figure 2.: Fall in groundwater table at Village Shankar, Dist. Jalandhar for the last 3 decades.