

Effects of Land Use Change on Phreatic Water Recharge in the Loess Tableland of China

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A long-term located monitoring of soil water, combined with the hydrogen and oxygen stable isotope tracer techniques were used to investigated effects of land use change on phreatic water recharge in the Loess Tableland of China. Results showed that piston flow and preferential flow coexisted in the process of phreatic water recharge. The isotopic compositions of groundwater were different from those of deep soil water but similar to those of precipitation, which indicate that preferential flow may be the main groundwater recharge mechanism at present. The yield of cropland has greatly increased and a large area of cropland has been converted to apple orchards since 1980s, which are responsible to the excessively consumed soil water storage in deep soil layers and a decrease of deep percolation of rainwater in different degree. As a result, the phreatic water table has been declining continuously, and a profound change in the natural water cycle and water balance has occurred in the Loess Tableland. The land use structure adjustments need to be guided by policy controls to ensure the renewable capacity and sustainable utilization of phreatic water resources.