

AHW023-04

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## Groundwater recharge and nitrogen contamination in urban area of the Kathmandu Valley, Nepal

Takashi Nakamura<sup>1\*</sup>, Ken'ichi Osaka<sup>3</sup>, Saroj Kumar Chapagain<sup>2</sup>, Kei Nishida<sup>1</sup>, Futaba Kazama<sup>1</sup>

<sup>1</sup>ICRE, Univ. of Yamanashi, <sup>2</sup>CREEW, Nepal, <sup>3</sup>University of Shiga Prefecture

Groundwater is an important water resource in Kathmandu valley, Nepal. It shares about 50% of the total water supply in the valley. In recent years, there has been a marked expansion in water demand due to population and industrial growth. It has led to heavy consequences on the groundwater levels and well yields, which are being declined (JICA, 1990). And the nitrate has recognized as a major pollutants in shallow groundwater. The objective of this study is to identify the nitrate contaminations under the shallow groundwater hydrology of Kathmandu Valley, Nepal.

The 35 shallow groundwater samples were collected public and domestic wells (depth of well are 5-20m). The nitrate-nitrogen and oxygen isotopes were determined by denitrifer method for the pre-treatment and analyzed using mass spectrometry (Sercon, Cryoprep and Hydra 20-20). And the water-oxygen and hydrogen isotope were analyzed by water equilibration system (Sercon, WES and Hydra 20-20).

The water-oxygen and hydrogen isotope values are suggested that annual rain water could be the primary source of shallow groundwater recharge rather than river water. The nitrate-nitrogen and oxygen isotope values suggested that human waste is the major source of nitrate contaminations in shallow groundwater. Furthermore, the existence of a clear slope between the nitrate nitrogen and oxygen isotope values indicated the occurrence of denitrification process in the shallow groundwater.

### Reference:

JICA (Japan International Cooperation Agency): Groundwater management project in the Kathmandu Valley, Final Report to Nepal water supply cooperation, 1990.

Keywords: nitrate-oxygen and nitrogen isotope, water-hydrogen and oxygen isotope, shallow groundwater, nitrate contamination, Kathmandu valley