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## Relationship between nitrate in river waters and land use in a hilly and mountainous area: stable isotope-based analyses

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Declining quality of waters arises from an imbalance of the inflow of pollutant loads such as nutrient versus the self-purification of waters. For urbanized areas where the population density is high, the sewage effluent can be a dominant source contributing to the increased nitrate concentration in rivers and often leads to the increased eutrophic levels in downstream waters. Also, for hilly and mountainous areas where the population is declining, the nitrate concentration in rivers can be increasing every year even though its cause remains unclear. One such example is Hii River, which is the largest river flowing into Lake Shinji and Lake Nakaumi in Shimane prefecture. The nitrate concentration in the Hii River tends to be increasing every year despite depopulation, an increased percentage sewered population and improved sewage disposal in the basin. That could cause algal blooms in Lake Shinji and Lake Nakaumi and thus immediate countermeasures are required.

Land use within a river basin is one of the most important factors influencing the nitrate concentration in the river water. However, little information is available about how land use affects river nitrate concentration in hilly and mountainous areas. This may be because the nitrate concentration varies within a relatively narrow range and thus appears to differ little among river basins with different land uses. Also, there is not always a constant relationship between the nitrate concentration and percentage of land use in the river basin because the nitrate concentration varies according to river discharge. In this study, to examine the effects of land use on river nitrate concentration in a hilly and mountainous area, river water samples were collected at the end of nine subbasins in the Hii River basin and concentrations and isotopic compositions of nitrate were analyzed. We are going to report those results.

Keywords: diffuse pollution, forest, hydrological condition, agricultural land, enclosed waters