Soil’s Physical Properties and Removal of Soluble Elements in a Modeled Paddy Field nearby Phayao Lake Wetland, Thailand

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Abstract The modeled paddy fields which imitated the fields near Phayao Lake wetland were constructed in order to study the soil’s physical properties and the migration of soluble elements that possibly affect the vulnerability of the lake. The model was made of a large PVC column (40 cm in diameter, 100 cm in height). The model was designed to reproduce the properties of each soil layer in the ill-drained paddy field which showed a closed system percolation. The study of the pressure head profile of the soil in our model showed a positive pressure for every soil layer. The redox (Eh) at the soil surface was in the “oxidation” state but every layer downward was in the “reduction” state. The reduction state highly affected the solubility of numerous elements and thus the migration of these elements to subsoil layer. Fe was found to be dissolved in underground water around 5-30 mg/L when nitrate was dissolved > 1.0 mg/L. In contrast, pH and electronic conductivity (EC) were higher than those of the standard values set for the surface water.

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