



Pesticide pollution in surface- and groundwater by paddy rice cultivation: A case study from northern Vietnam

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During the last decade, high population growth and export-oriented economics in Vietnam have led to a major intensification of rice production. In Vietnam, there is concern that lowland and upland paddy rice production systems are the major non-point sources of pesticide pollution of surface- and groundwater, both of which are used for domestic purposes. Against this background, quantifying and predicting pesticide losses to rivers or wells from paddy rice fields is a crucial task. The present study was designed to examine the environmental exposure of surface- and groundwater pollution in remote mountainous regions of northern Vietnam. In 2009 and 2010, we monitored the loss of four commonly applied pesticides from paddy rice farming systems to a receiving stream on the watershed scale and quantified groundwater pollution. Results indicate that for the entire monitoring period, runoff loss of pesticides from the watershed was estimated to range between 0.4% (dichlorvos) and 16% (fenitrothion) of the total applied mass. These losses were correlated well with the octanol-water partition coefficient and water solubility of pesticides. In the groundwater collected from eight wells, all target pesticides were frequently detected. Maximum measured concentration, for example, was up to $0.5 \mu\text{g L}^{-1}$ for fenitrothion. Our results strongly indicate that under the current management practice pesticide use in paddy rice fields poses a serious environmental problem in mountainous regions of northern Vietnam.

In our presentation, we will sketch the experimental setup and present and evaluate the key results of the present study.