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“Development on the margin”

Groundwater Pollution by Pesticides in a Watershed in Northern Vietnam

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Abstract

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 groundwater, which is often used for domestic purposes. Pesticides are toxic by design, calling for monitoring their impact on human health and environmental quality.

Against this background, the present study aimed at measuring temporal and spatial groundwater pollution patterns of pesticides in the mountainous Chieng Khoi watershed in northern Vietnam. During two rice cropping seasons in 2010, we monitored concentrations of five commonly applied pesticides (imidacloprid, fenitrothion, fenobucarb, trichlorfon, and dichlorvos) in 16 wells and one natural spring. The wells and the spring are serving domestic and drinking water for the local population. Furthermore, we conducted an extensive field survey among rice farmers to gain knowledge about current pesticide use, application practices and water consumption habits.

During the monitoring periods, all target pesticides were detected in the groundwater. At this, 27% (spring season, n=97) and 35% (summer season, n=105) of the analysed water samples showed pesticide concentrations above the detection limit. The pesticide concentration of 22% and 31% of samples exceeded $0.1 \mu\text{g l}^{-1}$, the European drinking water quality standard. Peak concentrations of $2.1 \mu\text{g l}^{-1}$ and $4.0 \mu\text{g l}^{-1}$ were detected for Imidacloprid during the spring and the summer season, respectively.

In our presentation, we will give a summary of the experimental setup and focus on key results providing evidence that under the current management practices, pesticide use in paddy fields poses a serious environmental problem in mountainous regions of northern Vietnam.

Keywords: Groundwater pollution, Northern Vietnam, paddy rice production, pesticides