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"Development on the margin"

Pesticide Residues in Soils and Sediments in the Mekong Delta, Vietnam

Melanie Bläsing[1], Ingrid Rosendahl[1], Zita Sebesvari[2], Fabrice Renaud[2], Wulf Amelung[1]

[1] *University of Bonn, Institute of Crop Science and Resource Conservation (INRES), Germany*
[2] *United Nations University, Institute for Environment and Human Security, Germany*

Abstract

Improper use of pesticides, as frequently reported to be prevalent in the Vietnamese Mekong Delta, can negatively affect the environment, human health and the economic return. Despite an increasing use of pesticides and raising concerns of the public for water quality and human health, no systematic monitoring of currently used pesticides has been put in place in the Delta yet. Concentrations of 13 different currently used pesticides were monitored at two representative study sites (An Long: rice monoculture, Ba Lang: mixed land use: vegetables, fruits and rice.) Samples were taken at both study sites in the wet and dry season in both, fields and irrigation canals. Pesticide analyses of the soil and sediment samples were conducted according to the method from Laabs et al. (1999). After extraction with acetone : ethyl acetate : water (2:2:1) ten of 13 pesticides were detected; concentrations ranged from 0,7 to 149 μg kg^{-1} DM. In average, sediments and soils from An Long showed higher detection frequencies and higher pesticide concentrations than those from Ba Lang which corresponds well with the more intensive agricultural setting at this study site (rice monoculture). Critical values for sediment and soil dwelling organism were exceeded by two pesticides (buprofezin and fipronil). The potential to set the groundwater quality at risk was evaluated as rather low. But the potential to pollute the surface water by particle bound transport and to harm aquatic and terrestrial animals or humans by bioaccumulation was estimated as high. This poses a threat for human health due to a direct consumption of very simple treated surface water as drinking water in the rural areas of the Delta. Furthermore, the consumption of animals reared on agricultural fields (wild capture or livestock-breeding within the main irrigation canals) as one of the main food sources leads to an endangerment of the resident population. As a consequence, an improved pesticide monitoring and the development of a sustainable water management are necessary in the Mekong Delta.

Keywords: Mekong Delta, pesticide residues, Vietnam

Contact Address: Melanie Bläsing, University of Bonn, Institute of Crop Science and Resource Conservation (INRES), Nussallee 13, 53115 Bonn, Germany, e-mail: melanie.blaesing@uni-bonn.de