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Environmental Risk Assessment of Pesticide Pollution in Rice Fields in the Mekong Delta

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Abstract

The risk assessment is essential for any environmental evaluation, in respect of the impact of study results on human health and ecosystem which contributes not only to current situation but also to sustainable future. This potential risk assessment is associated with 10 pesticides in rice fields predicted by the RICEWQ model in the Mekong Delta in 2009. The first evaluation with individual pesticides in water is addressed through the comparison to known toxic thresholds suggested by the European Union, Japanese Ministry of Environment, Environmental Protection Agency, in Australia, the UK and Taiwan while the second consideration is with regard to combined multi substances. The pesticides post from low risks found in isoprothiolane, propiconazole, buprofezin, cypermethrin and fenobucarb, to highest risks of butachlor and pretilachlor while difenoconazole and fipronil are still be at acceptable safety margins. Although these high concentrations decrease to below the limit within a day, the exceeding residues potentially harm human health and/or water bodies during irrigation practices. Related to soil compartment, almost residues are still under the critical values for “Sediment dwelling organisms” and “soil macro-organisms”. The adverse effects are determined as human health (buprofezin), fresh water (butachlor), inhalation (fenobucarb), invertebrate families (fipronil), fish species and alga (cypermethrin), soil organisms (buprofezin), or risk of bioaccumulation etc. Consequently, the requirements to reduce the loading and probably pesticide pathways through mitigation statements are necessary including proper irrigation practices, climate conditions related to pesticide usage, the implementation of the Integrated Pest Management, widely disseminated information on health concerns, safety using/treatment processes and storage, encouragement of pesticide surveys. Finally, the pesticide residues are higher than the estimated standards, these issues do not stand to inform that this area is under pollution status. The Vietnamese community needs to carefully establish the legislation in accordance with fully sustainable development. Regulation of registration processes and the improvement of the standard system on pesticides, offer a good opportunity to evaluate the impact of pesticide on human health and the environment.

Keywords: Human health, Mekong Delta, mitigation method, pesticide, rice field, RICEWQ, water