



Tropentag, October 7-9, 2008, Hohenheim

“Competition for Resources in a Changing World:  
New Drive for Rural Development”

## Short-Term Variation of Pesticide Loads in Mae Sa River, Northern Thailand

WALAYA SANGCHAN<sup>1</sup>, JOACHIM INGWERSEN<sup>2</sup>, THILO STRECK<sup>2</sup>

<sup>1</sup>*Chiang Mai University, Chemistry, Thailand*

<sup>2</sup>*University of Hohenheim, Institute of Soil Science and Land Evaluation, Germany*

### Abstract

Agriculture in the mountainous region of northern Thailand has been changed from traditional slash and burn to permanent cropping of cash crops. This land use change has been accompanied by an increased input of agrochemicals, which may be lost to streams and thus contaminate the surface waters in the lowlands. In previous phases, transport processes and flow mechanisms controlling the transport of pesticides from agricultural field into stream in field scale of the upland hill were studied. The investigations showed that pesticides are lost to the river predominantly by surface runoff and preferential interflow. There are several factors which affect loss of pesticides to surface waters; the time interval between the application and heavy rainfalls, the slope and the soil types in a catchment. The aim of this study is to determine the extent to which pesticide are lost to the Mae Sa stream and to explore the dynamics of losses after the first rain events in the rainy season. Pesticides monitored in this study include two organochlorines (Endosulfan, Chlorothalonil), four organophosphates (Dichlorvos, Chloropyrifos, Dimethoate, Atrazine), one pyrethroid (Cypermethrin), and one benzenoid fungicide (Metalaxyl). Water samples were collected in the beginning of the rainy season 2008 in the Mae Sa watershed (77 km<sup>2</sup>), northern Thailand. We used automatic samplers (ISCO 6217) at two locations of the main river, upstream and at the outlet. Sampling was performed either at selected times or volume-proportional. Samples were taken before, during and after stormflows. Water samples were extracted by SPE (solid phase extraction) method. Finally, the samples were analysed by GC-ECD or GC-NPD. The method for analysing water samples for the seven selected pesticides has been established. Limits of detection (LOD) were in the range of 0.3–10 ng ml<sup>-1</sup> for GC- $\mu$ ECD and 5–30 ng ml<sup>-1</sup> for GC-NPD. In a pre-test, Cypermethrin and Atrazine could be detected in river water. Finally, the short-term dynamics of pesticide loads into Mae Sa River in the beginning of the rainy season 2008 will be shown.

**Keywords:** First rainfall, pesticides, short-term dynamics, watershed