



Tropentag, September 17-19, 2013, Stuttgart-Hohenheim  
“Agricultural development within the rural-urban continuum”

## Water Regime in Paddy Rice Systems in Vietnam: Importance of Infiltration and Bund Flow

NADJA REINHARDT, THOMAS GUT, MARC LAMERS, THILO STRECK

*University of Hohenheim, Inst. of Soil Science and Land Evaluation, Germany*

### Abstract

In northern Vietnam, high population growth, resettlement programs and consequent land scarcity have led to an intensification of rice cultivation. Consequently, the amount of applied pesticides in paddy rice cultivation has tremendously increased. For paddy rice cultivation, however, there is concern that pesticides are lost from their target area possessing a serious environmental threat and contaminating surface- and groundwater. Both are used for domestic purposes. In northern Vietnam, many irrigated paddy systems include fish ponds. Especially in rural areas, fish can be considered as the main protein source for the local population. Therefore, main pathways of water losses should be identified and the significance of preferential flow for the translocation of pesticides should be analysed. Until now, water loss investigations from paddy rice fields in Northern Vietnam have not been carried out. The current study is filling this gap.

Four paddy fields were chosen meeting the following criteria: (i) direct adjacency to a fish pond, (ii) available information on the field and bund age, (iii) known management practice and (iv) the exclusion of intercropping. Double ring infiltrometer tests were carried out to determine vertical infiltration rates from paddy fields. To identify potential lateral pathways through the bunds, tracer tests were conducted using chloride and Brilliant Blue. After the experiments, the bund was dug up ten-centimetre-wise and water pathways were observed visually.

As already reported by Tuong et al. (1994), main water losses from paddy fields take place in dependence on macropores and consequentially on preferential flow. Via dye tracer tests, we proved that most lateral losses take place via macroporic bund flow. Bund flow occurred in all investigated bunds independent of the bunds' age and morphology. The distribution of macropores was regulated by the amount of plant roots and the activity of animals. Within the fields no water or very sparse water was lost. The presence of a plough pan and very high groundwater levels inhibited infiltration.

**Keywords:** Bund flow, northern Vietnam, preferential flow, tracer