



Tropentag, October 11-13, 2006, Bonn

“Prosperity and Poverty in a Globalised World—  
Challenges for Agricultural Research”

## Spatial Variability of Crop Growth as Affected by Contour Hedgerow Systems

WANWISA PANSAK<sup>1</sup>, THOMAS HILGER<sup>1</sup>, GERD DERCON<sup>2</sup>, THANUCHAI KONGKAEW<sup>3</sup>, GEORG  
CADISCH<sup>3</sup>

<sup>1</sup>*University of Hohenheim, Plant Production in the Tropics and Subtropics, Germany*

<sup>2</sup>*University of Hohenheim, Institute of Plant Production and Agroecology in the Tropics and Subtropics,  
Germany*

<sup>3</sup>*Naresuan University, Department of Agricultural Science, Thailand*

### Abstract

In the tropics, soil conservation measures to control water induced erosion have been intensively investigated in the past decades. Land management techniques such as contour hedgerow systems are very effective in erosion control but they also may lead to a pronounced spatial variability in crop response. However, our understanding of this phenomenon at field scale is limited. This study aimed, therefore, at assessing the spatial variability in crop response under contour hedgerow systems. Data were collected from an erosion control experiment in the Loei province of Northeast Thailand established in 2003. The trial was set up on a clayey, kaolinitic, typic Haplustalf in a split plot design with five maize cropping systems as main plots and two fertiliser levels (no fertiliser and 61 and 13.9 kg ha<sup>-1</sup> of N and P) as sub-plots. Slope gradients ranged from 21–28 %. From these treatments, farmer's practice, mango-grass hedgerows, and leucaena hedgerows, each at both fertiliser levels, were selected to conduct this study. Maize grain yields, aboveground vegetative biomass, harvest index and height were determined per row and related to their transect position in each plot. A simple index was used to assess the effect of contour hedgerows on crop response, indicating that contour hedgerow systems cannot always be evaluated as completely positive. The impact of contour hedges on maize growth in rows adjacent to the contour hedgerow was strong. Negative effects on crop growth, however, were stronger in the upper part of the alleys and in the mango-grass treatment. Soil fertility improvement on the upper part of the alleys and a better management of the barrier strip may enhance crop productivity.

**Keywords:** Contour hedgerows, crop response index, Leucaena, maize, mango, ruzi grass, spatial variability