

University of Hohenheim

FACULTY OF AGRICULTURAL SCIENCES



Institute for Soil Science and Land Evaluation (310)

Prof. Dr. K. Stahr

“Improvement of the Cropping System in the Limestone Area Bor Krai, Northern Thailand, under consideration of the soil water household and plant nutrition”

„Verbesserung des Anbausystems im Karstgebiet Bor Krai, Nord-Thailand, unter Berücksichtigung des Bodenwasserhaushalts und der Pflanzennährstoffe.“

Master Thesis

Torsten Hüller

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7. Summary

Rapid changes in upland farming systems in mountainous areas of South-Eastern Asia lead to increasing soil erosion rates, furthermore resulting in crop yield decreases induced by nutrient losses.

Several studies were realized to assess the actual situation all over South-East Asia, and hypotheses have formulated for future developments. Further declining crop yields, while rising erosion rates along with nutrient losses are expected. Actual and future scenarios, elaborated in this study with the simulation program EPIC, aim at confirming these presumptions. A further ambition was to determine important yield influencing factors. The selected research area for this study was the highly erosion prone mountainous area of Bor Krai in Northern Thailand.

Soil and climate data for the research site were provided by the research project "The Uplands Program" (SFB 564). Management data as well as further missing data were gathered for 15 fields by interviewing local farmers. The simulation with EPIC was calibrated and verified with the data sets mentioned above as well as with data taken from literature sources. Selected outputs focussed on rice and corn yields as well as on erosion rates.

The sensitivity analysis was performed to detect the most important yield influencing factors. The change of input factors, such as air temperature, soil type, minimum temperature for rice growth and sowing date of weeds showed evident effects on the grain yields. Further influence factors experienced a drop of their importance from about the year 2008 onwards, suggesting the presence of a further limiting factor. Supported by several authors, the hypothesis of nutrient losses through erosion and missing fertilization was formulated.

The results showed unanimously the tendencies of rice and corn yield decreases over the coming three decades, along with steadily increasing yearly erosion rates.

This study, which is a first attempt to simulate the agricultural situation of the Bor Krai area, confirms that soil conserving practices and nutrient supplying management practices need to be implemented as soon as possible in order to meet the increasing local food demand and secure the farmers' livelihoods.