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Diplomarbeit

Bewertung der Bodeneigenschaften unter Einfluss der Landnutzung und des Auftretens von Hangrutschungen in Muong Lum, Provinz Son La, Nordvietnam

von

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Evaluation of soil characteristic changes and their tendency to landslides due to deforestation and agricultural use in the mountainous region of Northern Vietnam

This diploma thesis is a contribution to The Uplands Program of the SFB 564 for „Sustainable Land Use and Rural Development in Mountainous Regions of Southeast Asia”.

The topical subjects of this thesis are landslides in the municipality of Muong Lum, district Yen Chau, province Son La in Northern Vietnam, including different kinds of land use and soil properties.

According to the local knowledge, severe weather conditions, particularly strong precipitation during the rainy season cause landslides on different places in the area.

It can be assumed that besides rain events the parent material and land use changes such as deforestation on those steep hills, which took place during the last decades, are reasons for landslides too. Therefore the main focus of this study lead in the assessment of soil properties and their contribution in understanding the occurrence of landslides.

These findings will help to improve sustainable land use recommendations in the future in order to prevent landslides

Therefore steep slopes with different land uses where clearly landslides took place in the past where examined in the area. In order to compare current conditions areas with same land uses but without landslides were additionally monitored. Soil properties were described and infiltration and shear strength was measured.

Additionally a dye-tracer experiment took place at some soil profiles in order to understand preferential flow paths and link it to textural characteristics. Landslides which occurred during the field study in 2008 where additionally monitored.

In order to judge the causes, interviews with farmers who cultivate the land, were carried out. These interviews led to important details concerning the meaning of the chronological sequence of different kinds of land use.

In view of the question the results document, that clearings, as they took place in Muong Lum in the past, led to changes of soil properties and site properties which affect the soil stability negatively and promote land slides due to the loss of biomass of roots which influence the moisture regime of soils.

Furthermore the monitoring of soil affected by new landslides in 2008 clearly showed the interrelationship between rainfall and landslides. Prior to the new occurring landslides heavy rainfall events took place.

The influence of the current land use management systems on soil properties and in consequence landslides was examined and positively confirmed by the analyses.

Additionally it became obvious that soils not affected by landslides differ from the group of soils that are affected with respect to certain properties which characterise all soils that are affected.