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**Effects of Slash & Burn Agriculture and Cocoa Plantation on the  
Water Chemistry of a Small Rainforest Catchment on Central  
Sulawesi, Indonesia**

ALEXANDER KLEINHANS<sup>1</sup>, GERHARD GEROLD<sup>1</sup>, SANCE LIPU<sup>2</sup>

<sup>1</sup>*Georg-August University Göttingen, Institute of Geography, Department of Landscape Ecology, Germany*

<sup>2</sup>*Universitas Tadulako, Indonesia*

**Abstract**

The interdisciplinary German-Indonesian research project “Stability of rainforest margins in Indonesia” concentrates on processes and principles which facilitate the maintenance of stability at the Central Sulawesi Province (Indonesia) with the protected area “Lore Lindu National Park” in the centre of the study area. Especially the borderline of the National Park is underlying manifold stresses caused by migration, illegal logging and forest conversion with its influence on the available water resources. The effects of forest conversion, slash&burn agriculture and cocoa plantation on the hydrological cycle and the water chemistry is monitored in the Nopu catchment (2.5 km<sup>2</sup>), which is considered as representative for the borderline of the National Park.

Since September 2001 meteorological measurements and hydrological measurements of runoff and runoff chemistry at three different river sections are continuously recorded. Due to the specific land use distribution each of the measured river sections is mainly representative for one predominant land use type. To investigate the impact of forest conversion on soil and stream water chemistry, soil water samples are weekly taken using 36 suction cups at the three different land use systems. Stream water samples and precipitation samples are collected daily. The following parameters are analysed: Na, K, Ca, Mg, P, N, NO<sub>3</sub>, Al, NH<sub>4</sub>, SiO<sub>2</sub>, EC, pH, DOC.

Preliminary results show that forest conversion with clear cut and burning leads to high element losses, which are enriching the associated slash & burn river section. The natural forest section in general has lower nutrient concentrations than the slash & burn section. Element concentrations of cocoa plantation section are in between. The perkoliation of the elements at plot scale and element concentration in stream water also depend on rain intensity and are therefore temporal very variable. A vertical chemical zonation can also be measured at all plots with steepest gradients at the slash & burn area. In conclusion our preliminary results show that slash & burn practice has an adverse outcome on stream water chemistry and water balance.

**Keywords:** Slash-and-burn agriculture, stream water chemistry, Sulawesi, tropical rainforest catchment