Geophysical Research Abstracts
Vol. 16, EGU2014-3885, 2014
EGU General Assembly 2014

Investigation of the impact of stone bunds on water erosion in northern Ethiopia

Jakob Rieder (1), Stefan Strohmeier (1), Nigus Demelash (2), Feras Ziadat (3), and Andreas Klik (1)

(1) Universität für Bodenkultur Wien, Department of Water, Atmosphere & Environment, Vienna, Austria (andreas.klik@boku.ac.at, 00431 36006 5499), (2) Gondar Agricultural Research Center, Gondar, Ethiopia, (3) International Center for Agricultural Research in the Dry Areas (ICARDA), Amman, Jordan

Soil degradation in northern Ethiopia results from intensive land-use, massive deforestation in the past and missing conservation measures. Every year huge amounts of fertile soil are flushed away irreversibly into the rivers. In order to prevent soil erosion, conservation methods are necessary, because otherwise erosion may cause severe problems in the future, especially in the cases of nutrition supply and agricultural land-use.

In this study, the effectiveness of stone bonds as a soil conservation method was evaluated. The assessments took part during the raining season from June to September 2013 in the Gumara - Maksegnit watershed in the Amhara region in northern Ethiopia. On farmland two erosion plots were constructed at a representative hillslope. The plots were 20m long, 3m wide and bordered with metal sheets. In order to compare the effectiveness of stone bunds on soil erosion, one plot was constructed with a stone bund on his toe slope the other plot was constructed without a stone bund. The investigated slope was selected that all characteristics like slope, crop cover, stone cover, soil aggregate size, etc... could be considered as similar. To evaluate the impact of stone bunds on soil erosion, the lateral and the longitudinal runoff from the plot with the stone bund were collected separately. Surface runoff and eroded sediment were collected at the downward end of the plot using a trough leading to a divider sampling 10% of the total runoff. The sample was then collected in a pond (1,8m long, 1m wide and 0,5m deep). During the investigated period soil loss from the untreated plot amounted to 23.0 t.ha-1, whereas only 13.5 t.ha-1 were measured spilling over the stone bunds. This corresponds to a decrease by 41%. Beside the erosion monitoring, stone and crop cover were analyzed regularly as well as surface roughness and soil texture.