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Evaluation of the Impact of Stone Bunds on Soil Loss and Surface Runoff in the Gumara Maksegnit Watershed, Northern Highlands of Ethiopia

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Ethiopia is highly affected by land degradation and one of the key problems is soil erosion. It is mainly caused by the rapid population increase, deforestation, low vegetation cover and unbalanced livestock and crop production. As far as about 85% of the Ethiopian population life of agriculture, it is essential to prevent or reduce further degradation.

In the Northern Highlands of Ethiopia stone bunds are widely used as a soil and water conservation measure (SWC). Stone bunds are little embankments of stones along the contour lines and influence the translation processes of surface runoff.

In June 2015 a field experiment was started in the Gumara Maksegnit watershed to investigate the impact of stone bunds on surface runoff and soil erosion. 4 m wide and 20 m long bordered replicated plots were installed with and without stone bunds. The average slope of the plots is about 8%.The design of the erosions plots with stone bunds allows the measurement of runoff along the stone bund as well as the overflow over it. At the end of the plots the sideflow and overflow are collected using a trough, then the runoff is divided by a multi-slot-divider and finally it is collected in storage ponds. Total runoff volume was measured and representative runoff samples were taken weekly to determine sediment concentration. Precipitation was measured in daily intervals next to the study site.

First results show the positive impact of stone bunds on soil erosion. From July to September total precipitation was around 600 mm. During the same time period plots without stone bunds delivered around 15 t/ha soil loss whereas plots with stone bunds produced only 5 t/ha. This is a reduction of 77%. Only approximately 10% of the sediment is transported over the stone bund, the rest is either deposited or moved along it. Runoff does not show the same pattern. Further data is being processed at the moment and will be presented.