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Structural practices for controlling sediment transport from erosion

Donald Gabriels, Koen Verbist, and Bruno Van de Linden
UNESCO Chair on Eremology. Dept. of Soil Management. Gent University, Belgium. donald.gabriels@gmail.com

Erosion on agricultural fields in the hilly regions of Flanders, Belgium has been recognized as an important economical and ecological problem that requires effective control measures. This has led to the implementation of on-site and off-site measures such as reduced tillage and the installation of grass buffers trips, and dams made of vegetative materials.
Dams made out of coir (coconut) and wood chips were evaluated on three different levels of complexity. Under laboratory conditions, one meter long dams were submitted to two different discharges and three sediment concentrations under two different slopes, to assess the sediment delivery ratios under variable conditions. At the field scale, discharge and sediment concentrations were monitored under natural rainfall conditions on six 3 m wide plots, of which three were equipped with coir dams, while the other three served as control plots. The same plots were also used for rainfall simulations, which allowed controlling sediment delivery boundary conditions more precisely. Results show a clear advantage of these dams to reduce discharge by minimum 49% under both field and laboratory conditions. Sediment delivery ratios (SDR) were very small under laboratory and field rainfall simulations (4-9% and 2% respectively), while larger SDRs were observed under natural conditions (43%), probably due to the small sediment concentrations (1-5 g l-1) observed and as such a larger influence of boundary effects. Also a clear enrichment of larger sand particles (+167%) could be observed behind the dams, showing a significant selective filtering effect.