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Performance and efficiency of geotextile-supported erosion control measures during simulated rainfall events

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Erosion control systems consisting of technical and biological components are widely accepted and proven to work well if installed properly with regard to site-specific parameters. A wide range of implementation measures for this specific protection purpose is existent and new, in particular technical solutions are constantly introduced into the market. Nevertheless, especially vegetation aspects of erosion control measures are frequently disregarded and should be considered enhanced against the backdrop of the development and realization of adaptation strategies in an altering environment due to climate change associated effects.

Technical auxiliaries such as geotextiles typically used for slope protection (nettings, blankets, turf reinforcement mats etc.) address specific features and due to structural and material diversity, differing effects on sediment yield, surface runoff and vegetational development seem evident. Nevertheless there is a knowledge gap concerning the mutual interaction processes between technical and biological components respectively specific comparable data on erosion-reducing effects of technical-biological erosion protection systems are insufficient.

In this context, an experimental arrangement was set up to study the correlated influences of geotextiles and vegetation and determine its (combined) effects on surface runoff and soil loss during simulated heavy rainfall events. Sowing vessels serve as testing facilities which are filled with top soil under application of various organic and synthetic geotextiles and by using a reliable drought resistant seed mixture. Regular vegetational monitoring as well as two rainfall simulation runs with four repetitions of each variant were conducted. Therefore a portable rainfall simulator with standardized rainfall intensity of 240 mm h^{-1} and three minute rainfall duration was used to stress these systems on different stages of plant development at an inclination of 30 degrees. First results show significant differences between the systems referring to sediment yield and runoff amount respectively vegetation development.