



## **Erosion Control and Recultivation Measures at a Headrace Channel of a Hydroelectric Power Plant using Different Combined Soil Bioengineering Techniques**

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As a consequence of land use change resulting in an increased number of slope protection constructions and with respect to effects associated with climate change like extremes in temperatures and temperature variations or increased frequency of heavy precipitation, adaptation strategies for sustainable erosion protection systems are needed which meet ecological compatibility and economical requirements.

Therefore a wide range of different technical solutions respectively geotextiles and geotextile-related products (blankets, nettings, grids etc.) are available on the market differing considerably in function, material, durability and pricing. Manufacturers usually provide product-specific information pertaining to application field, functional range or (technical) installation features whereas vegetational aspects are frequently neglected while vegetation can contribute substantially to increased near-surface erosion protection respectively slope stability. Though, the success of sustainable erosion control is directly dependent on several vegetational aspects. Adequate development of a functional vegetation layer in combination with geotextiles is closely associated to application aspects such as seeding technique, sowing date and intensity, seed-soil contact or maintenance measures as well as to qualitative aspects like seed quality, germination rates, area of origin, production method or certification. As a general guideline, erosion control within an initial phase is directly related to restoration techniques whereas vegetation specifics with regard to species richness or species composition play a key role in medium to long-term development and slope protection.

In this context one of the fundamental objectives of our study is the identification and subsequently the determination of the main interaction processes between technical and biological components of combined slope protection systems. The influence of different geotextile characteristics on specific vegetation properties are studied by setting up comparative test plots at a field study site located at a headrace channel of a hydroelectric power plant. Different vegetational parameters such as basal coverage, species richness, species composition, abundance/dominance values by using a refined Braun-Blanquet cover estimation scale were collected as well as local environmental properties.

Results during the first vegetation period show distinct effects of geotextiles especially on overall vegetation coverage and grasses-herbs-ratio. Geotextile supported plots show 20% higher overall coverage but lower amount of herbs after three months of vegetation growth compared to control plots without installation of auxiliary materials. Furthermore coir blankets reveal higher penetration resistance for seed leaves of herbal plants compared to coir nettings. Hence technical erosion protection products, biological components and it's combination have to be closely coordinated in order to achieve specified revegetation objectives and meet long-term functionality.