



## Long-term landslide ecological monitoring: the case of Pomezzana, Tuscany.

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Land degradation and soil erosion due to increasingly frequent extreme hydro-meteorological events, has negative consequences on ecological processes, making the environment, particularly rural and mountain areas, more susceptible to biodiversity loss. Nowadays, the use of plants as a building material transfers the plant multifunctionality within engineering structures and meets the demand rising from society for more environmentally friendly approaches to structure design. EU strategies and regulations require the employment of Nature-Based Solutions, such as Soil and Water Bioengineering techniques (SWBE).

Soil and Water Bioengineering techniques are applied worldwide, achieving great results for slope and streambank stabilization, water regulation, landslides restoration and for mitigation of environmental impacts. SWBE techniques manage natural hazard control using plants as living material in combination with inert natural material, achieving two main goals: on the one hand the technical function of stabilizing the soil on the other hand the mitigation of environmental damage, initiating natural ecological processes.

The research aims to evaluate the technical and ecological recovery effectiveness of a SWBE intervention for the restoration of a shallow landslide, occurred during Versilia flood in 1996. The project aims to monitor the evolution of vegetation and evaluate the composition of soil microorganisms by comparing the area restored by the intervention and surrounding areas. Field samplings and analysis will be conducted on two landslide bodies that occurred with the same extreme rainfall event: first site a landslide restored with SWBE techniques and the second site a naturally evolving landslide. A multi-approach methodology will be developed to evaluate differences and correlation between the ecological processes (vegetation and soil microorganism) and the technical efficiency of the landslide restoration intervention.