

From Disturbance Cascades to Recovery: Experiences with Close-to-Nature Forest Restoration Framework in Slovenia's Mountain Forests

Assigned Session: From seeds to sustainable forests – The importance of high-quality seed and plant material for the regeneration of Alpine forests

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ABSTRACT

Extreme events in forests are increasing in both intensity and frequency, and their consequences for forest ecosystems are becoming more complex, particularly in mountain regions. Climate change is modifying regeneration dynamics, while legacy effects of past management have amplified forest vulnerability. In the absence of targeted silvicultural

interventions, mountain forests risk losing structural integrity and resilience, thereby reducing their capacity to mitigate natural hazards. This is especially critical in the context of compound events, where multiple climate-related hazards interact and generate heightened socio-ecological risk. The recovery of disturbed stands, the steering of regeneration, and adaptation to climatically unstable future conditions are no longer solely the responsibility of local forest managers. They require coordinated, well-oriented action across the forestry sector, supported by relevant stakeholders and the wider public. Close-to-nature forest restoration offers a particularly promising pathway for effective regeneration after disturbance. However, its successful implementation depends on several enabling mechanisms: adaptive and innovation-oriented management planning; robust transfer of planned measures to field practice; continuous monitoring of regeneration outcomes and systematic learning; active collaboration among forest owners; and a supportive policy and institutional framework (including forestry regulations and subsidy schemes). Public acceptance and engagement at both local and broader societal levels further condition the feasibility and continuity of interventions. This contribution presents and evaluates Slovenian experiences with these mechanisms in the restoration of mountain forests following disturbance. Special emphasis is placed on the role of active forest management in maintaining stability and resilience, and in safeguarding the critical protective functions of mountain forests under future social and environmental change.

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