



Call: **H2020-RUR-2020-2**
Period: **06/2021 -> 05/2024**

ONEforest - A Multi-Criteria Decision Support System For A Common Forest Management to Strengthen Forest Resilience, Harmonise Stakeholder Interests and Ensure Sustainable Wood Flows

Project goal and overview: four Case Studies Regions will be established, following Europe's biogeographical regions, to study climateresilient silvicultural management practices and new methods of seeding and planting by the application of an own engineered topsoil cover based on wood fibres. Corresponding forest operations and concepts of actions in case of disturbances will be developed under selected sustainability criteria. Stakeholders will be activated in the participative process of socio-economic studies. The information will be consolidated in Dynamic Value Chain Model to assess the impact of the Forest-Wood Value Chain on regional development quantified by a set of economic, environmental and social indicators.

Laboratory and field studies on selected test sites on the engineering of a top soil coating (TSC) will be performed to support planting operations in Alpine, Mediterranean and Continental areas with high erosion risk and regions subjected to temporary drought. In specific, the following lab work will be conducted to assess physical, mechanical and chemical properties as well as the degradability of the TSC: (1) TSC development and engineering, (2) TSC application methodology (in cooperation with T5.4), (3) TSC slope stabilisation potential, and (4) TSC degradation by forest microbiota. The influence of the TSC on the near-surface soil characteristics (e.g. permeability, evaporation and transpiration, erosion tendency, water storage capacity, microbiological activities) and its application method will be assessed. The following experiments are planned: (1) Field experiments (living lab) including Lysimeter tests to assess the potential of the TSC to increase slope stability and its effects on the soil water characteristics; (2) Comparative studies with field and lab experiments (e.g. Soil-Water-Characteristics) to quantify a reduced risk of soil erosion potential, taking heavy rain events into consideration. In addition, a numerical validation of the field tests is performed using different constitutive laws; (3) Soil sample analysis will be subjected to microbiological analysis to assess the effects of the TSC application on the diversity and activity of microbial communities associated with the soil and plant rhizosphere; moreover, the potential biodegradation of TSC by soil microbiota will be assessed.

The [Department of Industrial Engineering](#) at the University of Trento will host one PhD student dealing with the following research topic:

ONEforest supports the deployment of regional forest management concepts that strengthen forest resilience and sustainable wood supply leveraging wood-based products. Within this project, an innovative top soil coating (TSC), based on a bio-degradable bio-composite, with water regulating properties will be developed. This layer should control precipitation uptake and evaporation rate of the soil, to reduce erosion and nutrient leaching. This TSC will allow new seeding methods to expand forests. It will contribute to planting young trees on unfavourable sites (e.g. in arid regions). The objective of this PhD work is thus to engineer a suitable TSC and describe its physical, mechanical, chemical characteristics and its impact on forest soil microbial communities. An LCA study that takes the TSC into consideration will be performed to assess its environmental impact. (contact andrea.dorigato@unitn.it or alessandro.pegoretti@unitn.it for details).

Gross yearly amount of Doctoral Scholarship: € 16.290,00 (more info at [Doctoral Scholarship](#))

Duration of the scholarship: 36 months, as from June 1, 2021