

Innovations for soil improvement from bio-waste BIN2BEAN

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From unhealthy soils to improved soil quality

Across the EU, between 60 and 70% of soils are unhealthy, as an outcome of erosion, loss of organic matter, contamination, unsustainable management practices and desertification, among other factors. Soil degradation in turn affects water pollution and scarcity, biodiversity loss, climate change, as well as food security, and thus has cross-border and transverse effects on human health, natural ecosystems, climate and on the economy. On the other hand, bio-waste, which is a valuable resource for improving soil fertility, is currently landfilled or incinerated in the EU at a rate of 80%.



Soil improving innovations with Living Lab pilots

The main objective of BIN2BEAN is to help EU cities meet EU targets and objectives in their transition to healthy soils and soil regenerative systems, by optimizing bio-waste recycling into soil improvers through innovative and economically viable value chains. The project will implement three Living Labs (LL), as pilot city-regions, to follow a multi-actor and participative approach.

In each LL, a tailored evaluation framework to demonstrate the safety, environmental and socio-economic performance of soil improvers will be co-designed and implemented, through field testing on experimental sites, feasibility studies and choice experiments. The data obtained will feed into a pilot scoring system to help cities select the most effective solutions. The highest scored solutions will be selected for the development of innovative and tailored business models.



▲ The research contributes to the realization of the following SDG goals.

Policy roadmaps help to reach land-based neutrality by 2035

The pre-market processes will be monitored through Techno-Economic Assessment (TEA). Finally, based on all previous results, local, national and EU policy roadmaps will be drafted, including waste charging policies and citizen awareness campaigns in the city-region, that will be piloted in LLs. All this will feed into a PDCA (Plan, Do, Check, Act) approach, enabling cities to create a continuous value-based improvement loop towards regenerative soil systems.

BIN2BEAN will support local waste management with the creation of 40 start-ups specializing in the soil improver value chains. This will help to reach Europe's 2035 objectives of reducing landfill to 10% of total waste while reinjecting nearly 135,000 tons of nitrogen and 45,000 tons of phosphorus into soils in an environmental and sustainable way.



▲ BIN2BEAN in a nutshell.

Safe soil secured with improved quality protocols

Finnish Food Authority's main role in BIN2BEAN is related to the evaluation framework including improved QA/QC protocols for collection, composting and/or anaerobic digestion of biowaste. In addition, improved testing methods are introduced to demonstrate the safety and quality of soil improvers. Harmonization and performance of the LLs laboratories will be tested through interlaboratory comparison test protocols.

A set of indicators will be developed to assess soil improvers holistically in terms of their performance on soil quality, soil ecosystem functioning and climate stressors on soil.

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