Synopsis of the Workshop

The ESAI/EPA Grassroots Workshop titled 'From Lab to Land: Engaging Communities in Soil Solutions' was held at the Greenway Hub, Room GW-402, Technological University Dublin (TU Dublin), on Thursday 12th March 2026. The workshop was held in a hybrid format from 11:00 AM to 3:00 PM, attracting approximately 20 in-person participants and 7 online participants. It was co-organised by Dr. Saurabh Singh and Dr. José Galán and funded through the ESAI/EPA Grassroots Workshop Support Scheme, forming a key dissemination and community engagement activity of the LOESS, ALELOENSUELOS, SARECO, MULTISOIL, PIROVALOR, RES2SOIL and MMeSH projects.

The workshop aimed to bridge the gap between laboratory-based soil science research and community-level engagement and education. Its principal themes encompassed soil health literacy, community-engaged research and learning (CERL), the agronomic and environmental potential of biochar-based fertilisers, the fate and bioactivity of natural compounds in soil, molecular biomarker development for soil health assessment, and citizen science as a vehicle for public engagement with soil management. The workshop provided a platform for knowledge sharing, problem identification, research–community dialogue, and networking across academic and practitioner audiences.

Dr. Saurabh Singh opened the workshop by welcoming in-person and online participants and providing housekeeping instructions. He set the thematic context by drawing attention to European-level data indicating that approximately 70% of EU soils are currently in a degraded condition, framing soil health as an urgent societal and scientific challenge requiring swift, coordinated action across research, policy, and community practice.

Dr. Claire McDonnell (TU Dublin) presented on community-engaged research and learning for soil health literacy, introducing the LOESS project and its rationale as a response to the persistent gap between academic soil science knowledge and public awareness. She outlined the CERL guidelines and modular educational resources developed for lecturers and educators, described the use of soil health mapping to identify potential sites for future community projects, and presented ongoing collaborative activities with the Liberties Community Project, through which TU Dublin students are implementing soil education activities with community participants. Audience members were invited to contribute to the LOESS soil health map.

Dr. Saurabh Singh then presented on the suite of tools and resources developed by the LOESS consortium, grounding the presentation in findings from the project's scoping phase desk research and stakeholder survey. He introduced the full portfolio of LOESS outputs; including learning scenarios, curriculum blueprints, an augmented reality application, a soil health podcast, a Massive Open Online Course (MOOC), a soil health glossary, a crowd-mapping tool, and a dedicated soil training module, alongside case study exemplars identified during the scoping phase to motivate and guide future CERL project design.

Dr. José Galán presented research on how soil properties govern the fate and bioactivity of naturally derived allelochemicals, with a focus on hydroxycoumarins as candidates for eco-friendly plant protection products. Drawing on empirical data, he demonstrated that soil significantly attenuates phytotoxic expression — with IC_{50} values increasing 5–50 times relative to Petri dish conditions — through adsorption, microbial degradation, and physico-chemical interactions that vary markedly between acidic and alkaline soils. He further presented granulated Cloisite 10A organoclay as an effective formulation strategy to protect allelochemicals from rapid biodegradation and enhance their persistence and bioactivity under field conditions.

Dr. Paloma Campos (Institute of Natural Resources and Agrobiology of Seville, IRNAS-CSIC, Spain) presented research on the production, characterisation, and applications of smart biochar and biochar-based fertilisers (BBFs) within a circular agriculture framework. She

demonstrated how pyrolysis temperature and feedstock type determine key biochar properties, and presented empirical results from field applications across several contexts: peat substitution in horticultural growing media, restoration of microbial diversity in soils contaminated by the 1998 Aznalcóllar mine accident in Spain, productivity trials in a super-intensive olive grove under deficit irrigation, and valorisation of agro-livestock residues. The presentation highlighted regulatory challenges and concluded with the argument that sustainable agriculture requires a shift from generic inputs to site-specific, science-backed soil solutions.

Dr. Shane O'Reilly (TU Dublin) presented research on the development of molecular test methods and indicators for comprehensive soil health assessment. He outlined his programme to generate novel baseline datasets and indicator sets across Irish land use types and soil types, integrating lipidomics, genomics, and metabolomics approaches across 219 sampling locations nationwide. Phospholipid fatty acid (PLFA) analysis and multivariate statistical techniques — including Redundancy Analysis and Principal Component Analysis — were used to demonstrate that microbial community composition and diversity differ significantly between intensively managed, semi-natural, peatland, and forestry soils. Next steps include untargeted lipidomics, integration of macrofaunal and elemental data, and the development of validated rapid field-deployable soil health indicators.

Following a 20-minute refreshment break, Dr. Saurabh Singh presented the Groundtruth project on behalf of Dr. Fiona Brennan (Senior Research Officer, Teagasc), who was unable to attend but generously prepared a complete set of slides for the occasion.. Groundtruth is a citizen science project, funded under the Research Ireland Discover Call in collaboration between Teagasc and VistaMilk with partners Airfield Estate and the National Biodiversity Data Centre, which ran from January to December 2025. The project engaged over 230 participants across more than 50 events, deploying accessible do-it-yourself soil health tests including earthworm counts, Visual Evaluation of Soil Structure (VESS), underwear decomposition scoring, and flower insect timed counts (FIT counts). Key lessons learned included the strong public appetite for practical soil skills, a preference for outdoor and group-based formats, and the importance of methodological simplicity.

The workshop concluded with a moderated panel discussion featuring Dr. Paloma Campos (IRNAS-CSIC), Dr. Shane O'Reilly (TU Dublin), and Ms. Lorraine Foley (TU Dublin). The discussion explored the translation of laboratory findings into accessible land management guidance, the scaling of citizen science methodologies, the interface between the EU Soil Monitoring and Resilience Directive and the scientific evidence base for soil health indicators, and the role of educational institutions in embedding soil literacy across formal and non-formal learning settings.

All speakers and participants expressed strong optimism regarding the potential of the tools, methodologies, and collaborative frameworks presented to advance soil health literacy and practice in Ireland and across Europe. The workshop reinforced the value of a lab-to-land approach that situates laboratory science within a broader ecosystem of community engagement, educational innovation, and evidence-based policy development. Future recommended activities include field trials of LOESS educational resources in community settings, expansion of the LOESS soil health mapping tool, and the continued development of validated molecular indicators for national soil monitoring.

This workshop was sponsored by the ESAI in partnership with the EPA via the Grassroots Awards Scheme. The EPA/ESAI Grassroots Workshop Support Scheme provides funding to postgraduate and postdoctoral researchers to organise stand-alone workshops, in the broad environmental research area, that fall within the remit of the ESAI and EPA. For further information, contact: www.esaiweb.org/funding---awards/grassroots-award-scheme/

Photo:


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ESAI/EPA Grassroots Workshop - TU Dublin - 12 March 2026
Dr. Saurabh Singh – Workshop Opening
Dr. Claire McDonnell – CERI & Soil Health Literacy
Dr. José Galán – Allelochemicals in Soil
Dr. Paloma Campos – Smart Biochar & BBFs
Dr. Shane O'Reilly – Molecular Soil Biomarkers
LOESS Sugar-Snap Pea Seeds & Bookmarks for Participants
Engaged Participants
Panel Discussion
Workshop in Progress