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ID ABS WEB: 137918

4. Soil health in achieving the Sustainable Development Goals
4.27 133609 - How will we monitor soils in the coming century?

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The EU Soil Strategy for 2030 and the Proposal for a Directive on Soil Monitoring and Resilience aim to achieve healthy soils by 2050. This information is currently provided at European level by LUCAS soil survey and nationally through monitoring networks (N-SIMS) developed individually by each member state with different approaches. In this context, integrating data from diverse sources (i.e. LUCAS soil and N-SIMS) is essential.
Under the EJPSOIL programme, twelve countries employed a common methodology to compare their N-SIMS to LUCAS Soil in terms of sampling strategy and representativeness of land use and soil types. This analysis revealed significant disparities in monitoring strategies, including variations in sampling design, monitored land cover, and sampling depth. While most N-SIMS and LUCAS Soil used a stratified random sampling design, some N-SIMS employed a regular grid approach. Sampling depth varied across countries, with some using fixed depth intervals and others opting for soil horizons sampling, while LUCAS Soil sampled topsoil at 0–20 cm depth (0-30cm in LUCAS 2022). Site density was generally higher in N-SIMS than in LUCAS Soil, with some cases exhibiting a difference of one order of magnitude. The significant increase in the number of sites in the LUCAS Soil 2022 campaign partially filled this gap. The spatial distribution of N-SIMS appeared more homogeneous than LUCAS Soil, especially in countries like France and Spain where N-SIMS followed a grid-based system and in regions with extensive mountainous areas systematically excluded by LUCAS Soil.
Comparisons of site proportions in different soil types or land cover classes indicated that N-SIMS results were more aligned with the current estimated proportions (calculated by using Corinne Land Cover and WRB, respectively) compared to LUCAS Soil. However, both methods exhibited significant variations from current estimated proportions. This work underscores differences in sampling protocols and representativeness among N-SIMS and between N-SIMS and LUCAS Soil. This is a preparatory work towards the soil properties comparisons among soil monitoring programs.

Keywords: Soil monitoring networks,LUCAS soil survey,Sampling strategies