Comparing soil properties between LUCAS Soil and national soil information monitoring system (N-SIMS): major differences and implications for future policies to evaluate soil quality

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COMPARING SOIL PROPERTIES BETWEEN LUCAS SOIL AND NATIONAL SOIL INFORMATION MONITORING SYSTEM (N-SIMS): MAJOR DIFFERENCES AND IMPLICATIONS FOR FUTURE POLICIES TO EVALUATE SOIL QUALITY

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A recent assessment states that 60-70% of soils in Europe are considered unhealthy. To protect this valuable resource, we need to acquire knowledge about it through soil monitoring to assess the soil status and detect soil changes over time.
In Europe, different types of monitoring networks currently exist in parallel. Many EU Member states (MS) developed their own soil information monitoring system (N-SIMS), some being in place for decades. In 2009, to develop a homogeneous dataset for EU, the European Commission extended the periodic Land Use/Land Cover Area Frame Survey (LUCAS) led by EUROSTAT to sample and analyse the main properties of topsoil in EU.
To support European policies, there is a clear need to evaluate soil quality and establish reference values to assess soil health. However, a question remains whether the assessment obtained by using soil properties from both monitoring programs (N-SIMS and LUCAS Soil) are comparable, and what could be the limitations of using either one dataset or the other.
In the context of EJP Soil, a comparison of three soil properties (organic carbon, pH and clay content) has been conducted among 12 different EU countries including BE, DE, DK, EE, ES, FR, DE, HU, IT, NL, PL, SE and SK. In addition, a comparison of two indicators including (i.e. OC/Clay and pH classes) using each programs dataset has been conducted. The results underlined substantial differences in soil properties statistical distributions between N-SIMS and LUCAS Soil in many countries, particularly for woodland and grassland soils, affecting the evaluation of soil quality using indicators. Such differences might be explained by both the monitoring strategy (spatial distribution of sites) and sampling protocols exposes the potential effect data source on European and national policies. Those results advocate for a dialogue between national institutions conducting soil monitoring and LUCAS Soil to harmonize the data and strengthen future soil monitoring to provide reliable data for reaching the objectives of healthy soils.

Keywords: Soil monitoring,LUCAS Soil,policy,organic carbon,soil sampling