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4. Soil health in achieving the Sustainable Development Goals
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UNRAVELLING SOIL MICROBIAL DIVERSITY AND FUNCTIONALITY IN A TRANSDISCIPLINARY FRAMEWORK: URBAN AND RURAL SOILS NARRATING HUMAN FOOTPRINT

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While little is still unknown about the relationship between soil physicochemical properties and soil microbial community structure, diversity and functionality, and while the effect of plethora of land uses on them have been widely dissected, the complex interactions between soil microbial properties and functionality and the human environment factors remain definitively unexplored.
Soil physicochemical properties are deeply affected by human activities, and they have been confidently recognised as the main drivers of soil microbial communities, however no data is still available on the direct effect of the "human diversity" on soil ecology. Several studies compared soil microbial ecology metrics, computed for urban, agricultural and natural forest soils but they rarely, or fairly never, pinpoint the effect of the same land use practised by different human actors neither in urban nor in rural areas.
In the context of a social research project we aimed to unravel the relationships between human communities aboveground and microbial communities underground, both taking care of the same soil types. We conducted participative research practices, involving researchers from different disciplines and common citizens to explore soil microbial communities structure, diversity and functionality. Four main agro-ecological land management types have been studied from a multiple transdisciplinary point of view and experimental sites selected to maximise their representativeness of the human environment of the study area. We practised soil metagenomics to analyse microbial diversity and litterbags NIR sage to study microbial functionality.
The same regenerative agricultural practices carried out by researchers in a "research residence" located in a marginal ancient rural area and by citizens in a metropolitan urban area were considered, unravelling their effect on the one hand on soil functional biodiversity, on the other hand on human wellbeing both for researchers and for citizens.
Soil health, a widely debated topic within both the general public and academia, is here taken as a meeting point, pursuing the ambitious objective of building bridges between researchers and citizens.

Keywords: Soil metagenomics,Microbial diveristy,Human diversity,Regenerative agriculture,Litter bags