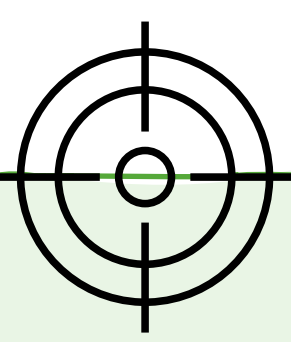


# Assessing Urban Nature-based Solutions through Soil Biochemical Indicators: A Multi-City Study in Italy

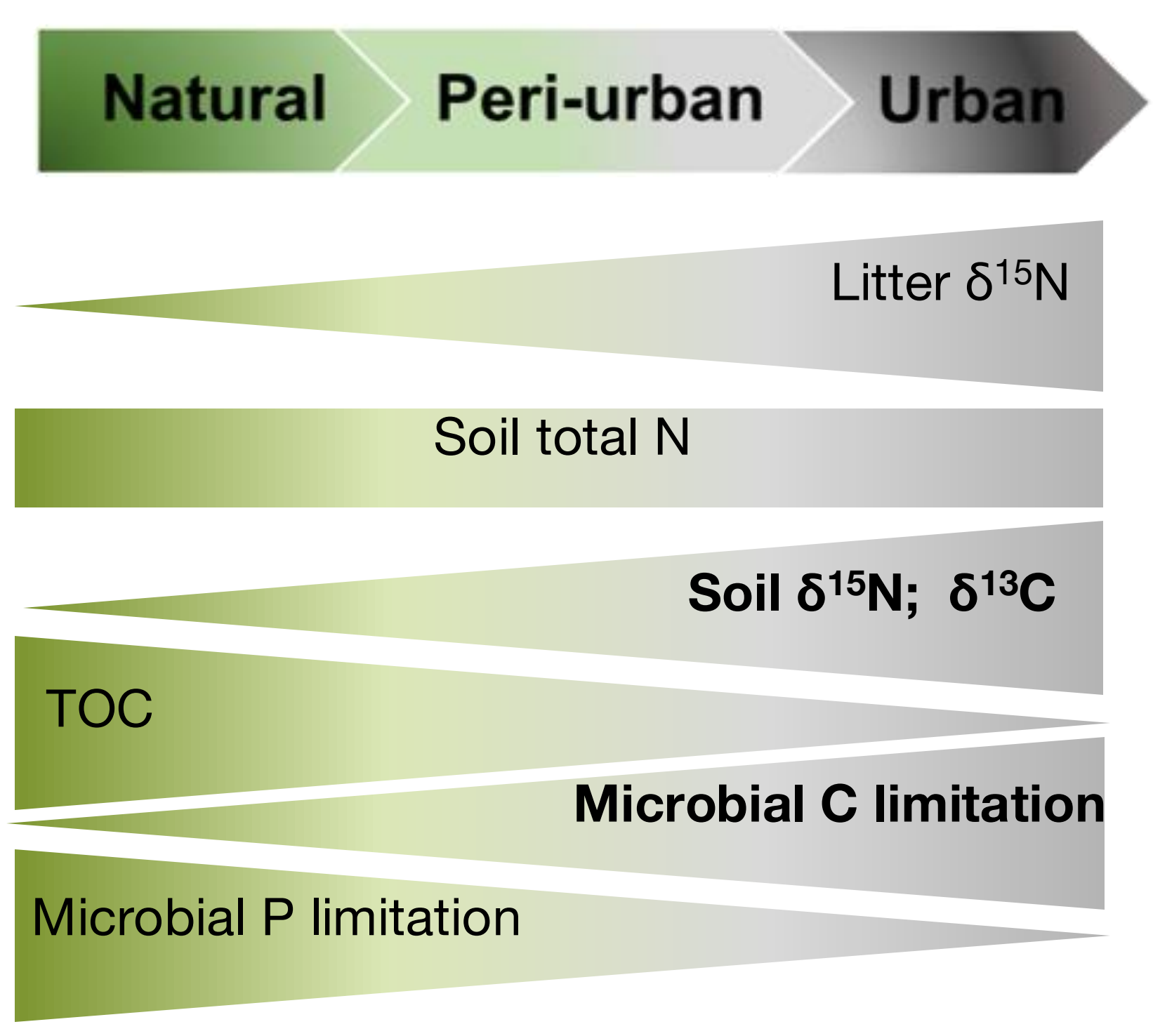
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This study focused on evaluating and validating the use of stable isotope composition and soil enzyme activities as indicators of soil health and their sensitivity to environmental disturbances, particularly urbanization

Step 1

Testing and validation of the indicators in green areas dominated by *Quercus ilex* L. along an urban-to-natural gradient in the cities of Pisa and Livorno



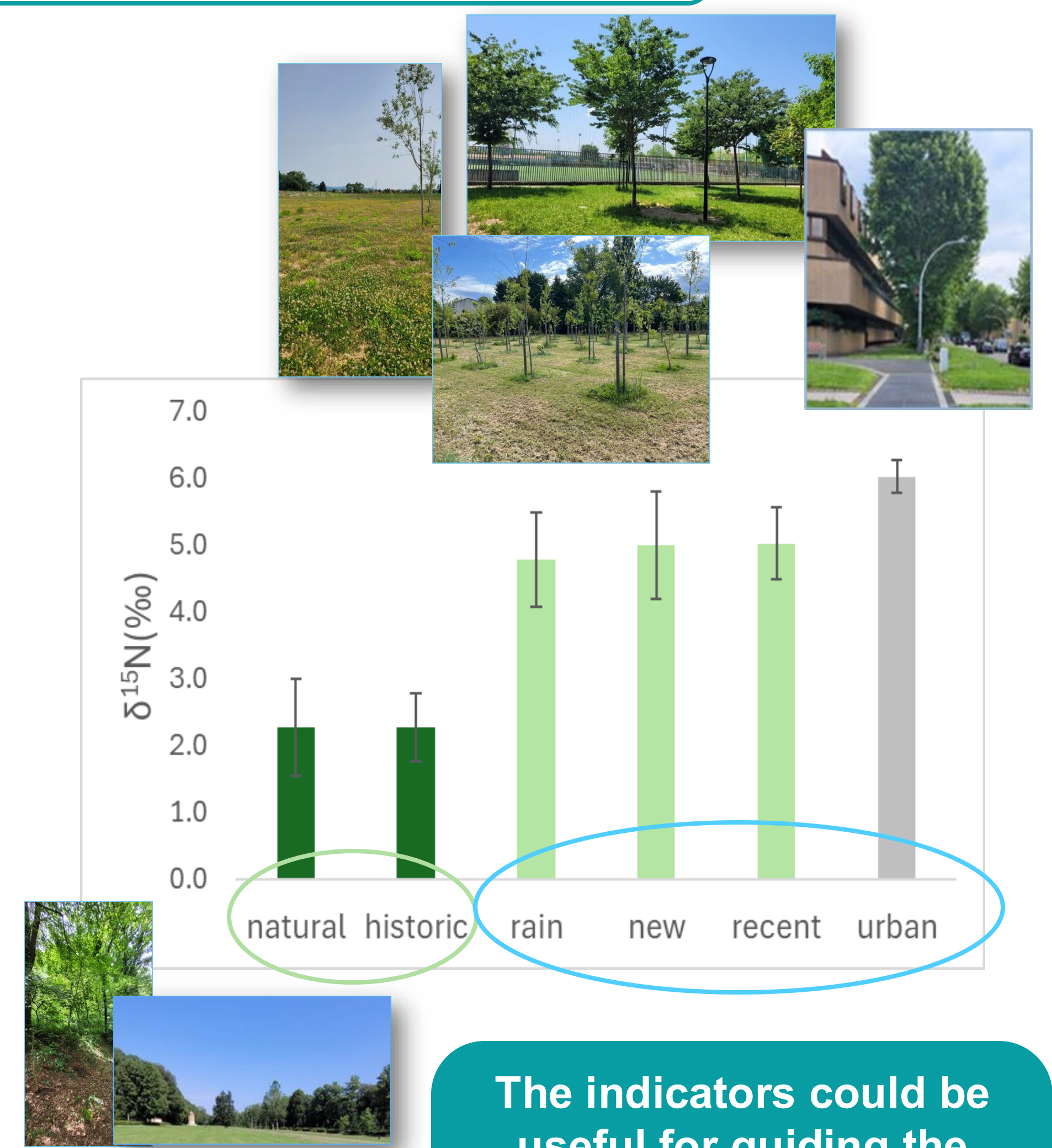
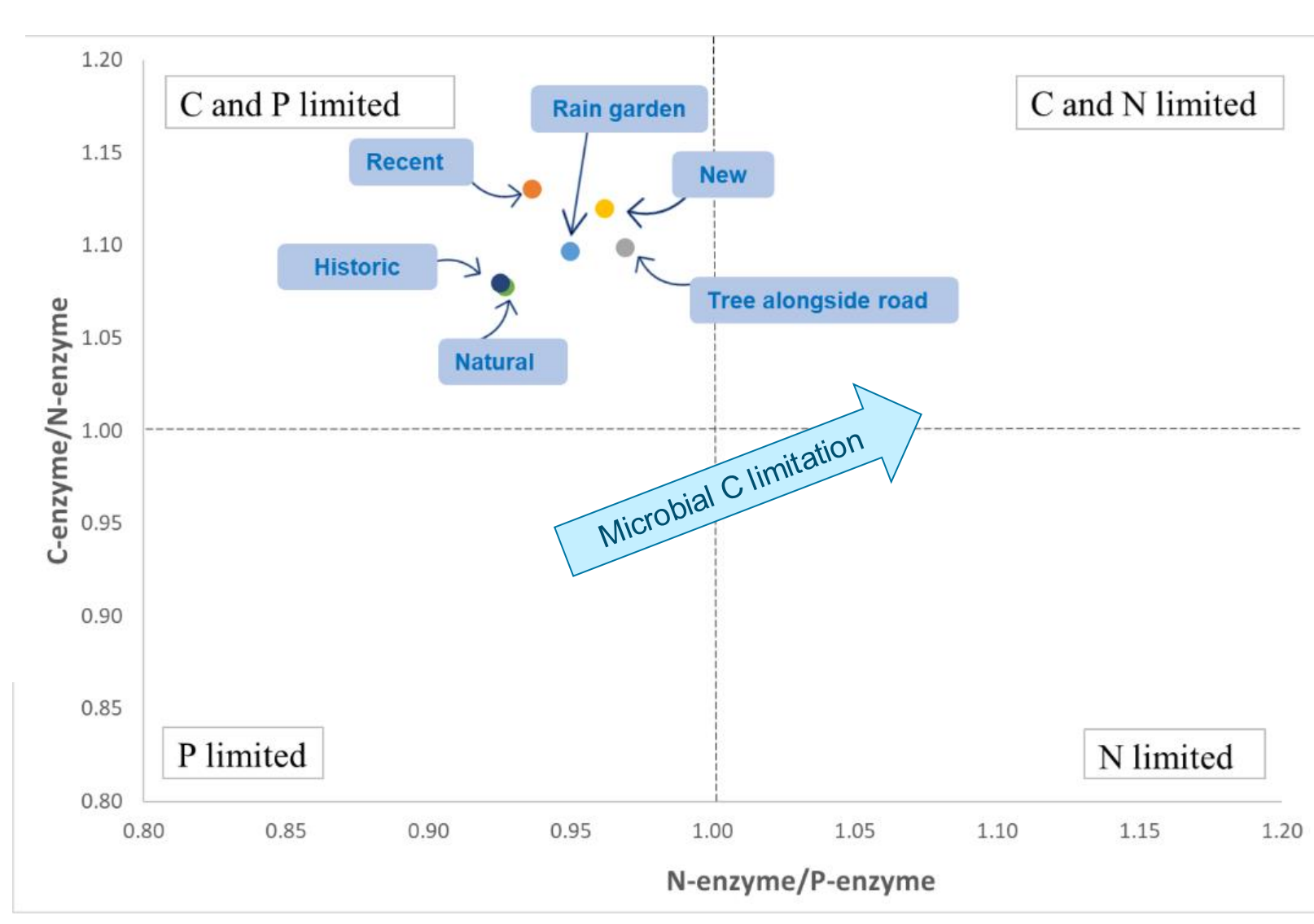
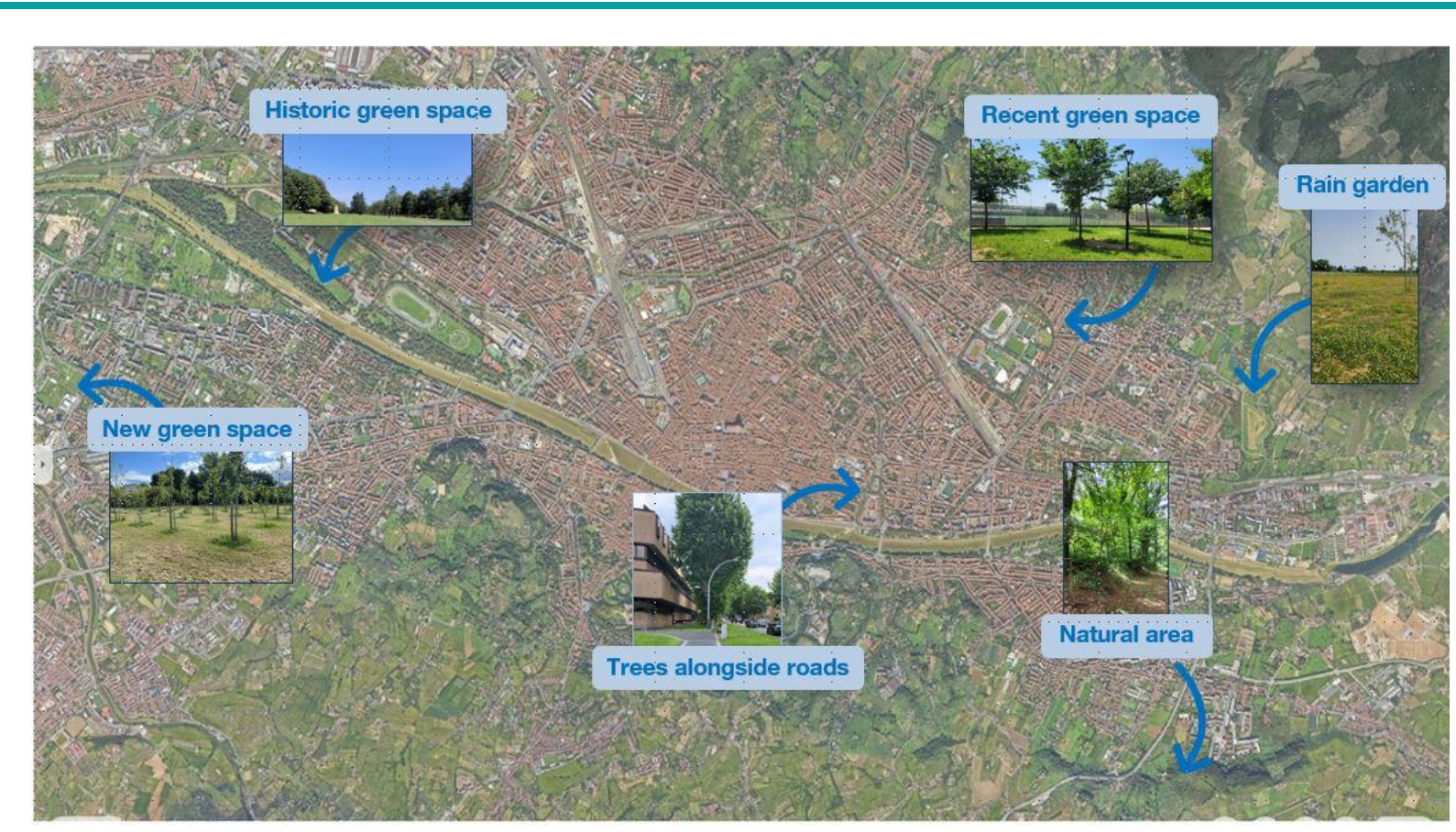
Stable C and N isotopes and enzyme activities (related to microbial C e P limitations) changed along the urbanization gradient

The indicators are effective in detecting changes in soil functioning related to urban pressure

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 Isotope signature and ecoenzymatic stoichiometry as key indicators of urban soil functionality  
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Step 2

Application of the indicators in other Italian cities to evaluate the efficiency of different NbS, such as green infrastructure, in providing key ecosystem services, including soil health



Historic green space was similar to natural site for microbial metabolic requirements and isotope composition

The indicators could be useful for guiding the management and planning of green infrastructure in urban areas

Soil enzymes and stable isotopes were suitable for assessing the effectiveness of urban green infrastructures in improving soil health, in terms of carbon and nutrient cycles