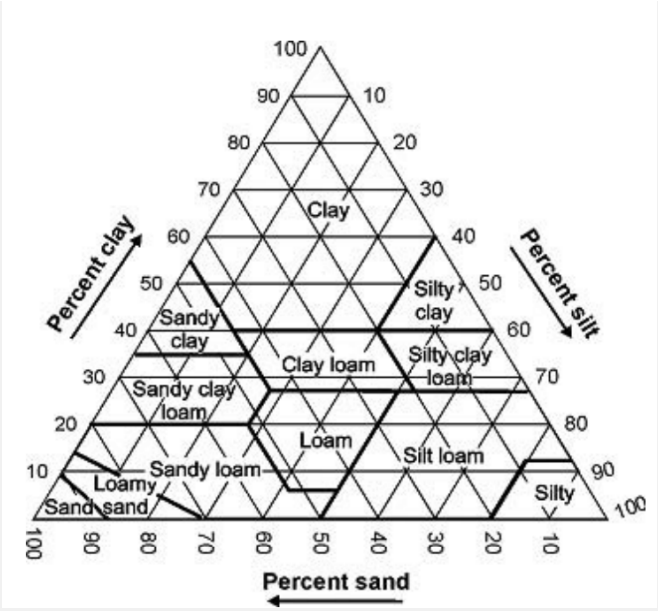
References	Motsara M.R., Roy R.N. (2008), *Guide to laboratory establishment for plant nutrient analysis*. FAO fertilizer and plant nutrition bulletin.



Soil texture classes according to proportions of sand, silt and clay (Motsara, Roy, 2008)

8.27 Soil chemical fertility

Project Name: Nature4Cities

Author/s and affiliations: Ryad Bouzouidja[1], Patrice Cannavo[1], Stéphanie Decker[2]

[1] *Institut Agro – Ecole interne AGROCAMPUS OUEST, 2 rue André Le Nôtre, 49045 Angers Cedex 01, France; e-mail: patrice.cannavo@agrocampus-ouest.fr*

[2] *NOBATEK/INEF4, 67 Rue de Mirambeau, 64600 Anglet, France*

Chemical fertility of soil - Cfer	Green Space Management
Description and justification	**Cfer** relates to the mineral nutrition of plants via the concepts of biodisponibility of elements, deficiencies, toxicities and equilibria
Definition	Evaluation of the quality of soil, in this case chemical soil fertility (Nature4Cities D2.1) : - to assess the ability of soil to grow ornamental plants and food (vegetables) - to improve the soil properties if necessary (1) addition of limestone to adjust pH, (2) addition of compost to increase

	the organic carbon content, (3) addition of mineral nutrients if there is a risk of chlorosis... The output is qualitative (poor, moderate or optimal) or 0 to 1
Strengths and weaknesses	This indicator is capable to describe initial planning problems, like soil nutrient deficiency for plant growth. It is possible to apply the indicator in numerous cases (various locations). The indicator has been used in different circumstances (different soil uses) and delivered reasonable results. However it requires a number of samples adapted to soil heterogeneity
Measurement procedure and tool	REQUIRED TOOL • soil sampling materials • laboratory analytical tools CALCULATION METHOD • measurement of each parameter • global evaluation from evaluation of each parameter
Scale of measurement	☒ City ☒ Neighbourhood ☒ Object
Data source	• Bibliography • Measurement/Monitoring
Required data	Organic C, Total N, K, C/N, pH method: (water, $CaCl_2$), $CaCO_3$, CEC (methods : Metson, CobaltiHexamine), P (Olsen method)
Data input type	• physicochemical measurements • chemical analyses
Data collection frequency	• Initial diagnostic/ assessment in case of hardly growth of vegetation
Level of expertise required	Easy to calculate but requires data. This indicator requires laboratory or on-site measurements The data could have been already collected in case of soil characterisation but usually not. Measuring the parameters is the best way to calculate this indicator, because urban soil properties are very spatially heterogeneous.
Synergies with other indicators	In Nature4Cities the Cfer KPI is calculated using cation exchange capacity parameter (CEC in meq/100 g) (Nature4Cities D2.4). This parameter is a measure of the quantity of negatively charged sites on soil surfaces that can retain positively charged ions (cations) such as calcium (Ca^{2+}), magnesium (Mg^{2+}), and potassium (K^{+}), by electrostatic forces. Cation exchange capacity of soil is measured according a standardized method: the ammonium acetate method according to Kahr and Madsen (1995). The Cfer score is on one hand also expressed in form of a performance bar with numerical values ranked in terms to the best (1) and worst (0) scenario
Connection with SDGs	SD15 Life on Land

Opportunities for participatory data collection	
Additional information	
References	Damas, O., & Rossignol, J. P. (2009, June). Identification of mineral and organic waste resources as alternative materials for fertile soil reconstitution. In II International Conference on Landscape and Urban Horticulture 881 (pp. 395-398). Kahr, G, and FT Madsen. 1995. "Determination of the Cation Exchange Capacity and the Surface Area of Bentonite, Illite and Kaolinite by Methylene Blue Adsorption." Applied Clay Science 9 (5): 327–336. https://doi.org/10.1016/0169-1317(94)00028-O. Vidal-Beaudet, L., Rokia, S., Nehls, T., & Schwartz, C. (2016). Aggregation and availability of phosphorus in a Technosol constructed from urban wastes. Journal of Soils and Sediments, 1-11. Rokia, S., Séré, G., Schwartz, C., Deeb, M., Fournier, F., Nehls, T., ... & Vidal-Beaudet, L. (2014). Modelling agronomic properties of Technosols constructed with urban wastes. Waste management, 34(11), 2155-2162. Nature4Cities, D2.1 - System of integrated multi-scale and multi-thematic performance indicators for the assessment of urban challenges and NBS. https://www.nature4cities.eu/post/nature4cities-defined-performance-indicators-to-assess-urban-challenges-and-nature-based-solutions Nature4Cities, D2.2 - Expert-modelling toolbox Nature4Cities, D2.3 – NBS database completed with urban performance data https://www.nature4cities.eu/post/applicability-urban-challenges-and-indicators-real-case-studies Nature4Cities, D2.4 - Development of a simplified urban performance assessment (SUA) tool

8.28 Flammability Index

Project Name: PHUSICOS (Grant Agreement no. 776681)

Author/s and affiliations: Gerardo Caroppi[1,2], Carlo Gerundo[2], Francesco Pugliese[2], Maurizio Giugni[2], Marialuce Stanganelli[2], Farrokh Nadim[3], Amy Oen[3]

[1] *Aalto University, Department of Built Environment, Espoo, Finland (gerardo.caroppi@aalto.fi)*

[2] *University of Naples Federico II (UNINA), Department of Civil, Architectural and Environmental Engineering, Naples, Italy*

[3] *Norwegian Geotechnical Institute (NGI), Oslo, Norway*

Flammability Index	Green Space Management