
Assessing the Functional Attribute Diversity (FAD) for two nature-based solutions: green roofs and urban trees

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Résumé

Urban Nature-based Solutions (NBS) can provide multiple ecosystem services (ES) such as stormwater management, habitat provision for biodiversity, summer comfort, urban heat island reduction, etc. NBS and the ES they furnish are increasingly studied and assessed. However, few studies provide an objective assessment of NBS. Moreover, these studies tend to provide qualitative indicators for the ES studied. Therefore, there is a lack of objective and quantitative assessment of NBS and the ES they provide. To fill this gap, this work focuses on the Functional Attribute Diversity (FAD) as a quantitative indicator for the assessment of functional diversity. The FAD is complementary to existing indicators, such as those provided by the HIBOU method (Brachet, 2020).

Biodiversity is a very complex and multi-faceted field. It presents multiple aspects (such as specific diversity, functional diversity, ecological connectivity, etc.), all of which are important to consider. A bibliographical review is conducted to select an appropriate indicator. The FAD was selected according to the following criteria: complementarity with the indicators provided by the HIBOU method (Land Use Change expressed in potential loss of species, Harmonized Green Factor providing information on the biodiversity potential of a site’s surfaces) and easy to analyze. Its calculation process based on species inventories and functional trait values is detailed. A species inventories database for the Ile-de-France Region is also constructed to be used as a proxy. Additionally, this work describes the application of the developments to a case study and the results are discussed. Several scenarios of the same urban project with different levels of greening are used, indicators are calculated, and results are debated.

The challenges raised by the assessment of urban NBS are also discussed: the equilibrium between the multi-aspect and precision of the biodiversity assessment and the optimum number of indicators that users will be comfortable working with.

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Mots-Clés: nature, based solutions, ecosystem services, biodiversity assessment, functional diversity, performance indicators