

A Proposal to Integrate Spatially Explicit Ecosystem Services with Urban Metabolic Modelling

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Abstract : The integration of urban metabolism (UM) with spatially explicit ecosystem service (ES) stocks has the potential to advance sustainable urban development. It will correct the lack of spatially specificity of current urban metabolism models. Furthermore, it will include into UM not only the physical properties of material and energy stocks and flows, but also the implications to the natural capital that provides and maintains human well-being. This paper presents the first stages of a modelling framework by which urban planners can assess spatially the trade-offs of ES flows resulting from urban interventions of different character and scale. This framework allows for a multi-region assessment which takes into account sustainability burdens consequent to an urban planning event occurring elsewhere in the environment. The urban boundary is defined as the Functional Urban Audit (FUA) method to account for trans-administrative ES flows. ES are mapped using CORINE land use within the FUA. These stocks and flows are incorporated into a UM assessment method to demonstrate the transfer and flux of ES arising from different urban planning implementations.

Keywords : ecological economics, ecosystem services, spatial planning, urban metabolism

Conference Title : ICSUDSP 2017 : International Conference on Sustainable Urban Development and Spatial Planning

Conference Location : Copenhagen, Denmark

Conference Dates : August 17-18, 2017