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An Assessment of the Potential for Bio-based Land Uses on Urban Brownfields

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ABSTRACT

Circular Economy (CE) is expected to accelerate the emerging shift in resource consumption from finite to renewable, and plants are key in enabling the switch as industries would opt more and more for resources with a bio-based origin. Cities have an important role in the process not only as the main consumers of the resources but also because vegetation provides numerous tangible and intangible ecosystem services essential for the wellbeing of urban dwellers. But the urban lands are heavily burdened with present activities and ongoing urbanisation. Retrofitting obsolete and potentially contaminated brownfields within the urban periphery provides an opportunity to engage in bio-based land uses. At the same time, vegetation can be incorporated with Gentle Remediation Option (GRO), a possible alternative and more sustainable option over common ‘dig and dump’ remediation to manage risks due to contamination and restore soil health. The overall aim of this thesis is to identify bio-based land use opportunities on urban brownfields and to develop appropriate decision support to assess the potential for their realisation. This thesis presents a framework for assessing the bio-based land use potential on brownfields consisting of three practical tools: a conceptualisation of linkages between GROs and prospective Urban Green Space (UGS) uses, a scatter diagram for the realisation of 15 UGS opportunities on brownfields, and a decision matrix to analyse the requirements for UGS on brownfields. The decision matrix tool is applied to the case study site Polstjärnegatan in Gothenburg, Sweden, where six potential UGS uses are filtered out for the site. The assessment of bio-based land use potential on urban brownfields can be further improved by incorporating stakeholder planning and governance, decision support for the site-specific applicability of GRO and GRO selection, and land use specific risk management.

Keywords: Circular Economy (CE), Bio-based CE, Brownfields, Gentle Remediation Options (GROs), Bio-based land use, Urban Greenspaces (UGSs)