

ECOSYSTEM SERVICE VALUES AND GREEN INFRASTRUCTURE IMPLEMENTATION IN URBAN PLANNING AND DEVELOPMENT: INSIGHTS FROM FIVE CANADIAN COMMUNITIES

Major Research Paper – Executive Summary

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As global biodiversity and ecosystems dwindle, there is growing need to restore, conserve, and enhance the ecosystem services (ES) critical to urban existence. To restore ES lost during urbanization, municipalities have begun to implement ecosystem-based features known as green infrastructure (GI) into urban development. Various tangible and non-tangible benefits (ES) are associated with GI, including stormwater management, urban heat island mitigation, pollution control, passive recreation, among others. The relationship between GI and the ES they provide to urban environment are clearly understood, as various GI approaches provide differing ES benefits.

However, it is unclear how the ES values of stakeholders affects the implementation of GI in the urban land development process. Furthermore, while much research has addressed the incorporation of ES science into policy, there is a paucity of research focused on how stakeholder ES values influence the uptake, design, and mainstreaming of GI through urban development processes. Furthermore, despite the private sector's role in leading land development in capitalist countries, there is a lack of research considering the role of developers in ES governance and GI mainstreaming.

Through a qualitative approach, this study uses key-informant interviews and municipal plan analyses to elucidate the prioritization of ES in five Canadian municipalities, and its impact on the adoption of GI into urban development. We found that ES values are largely implicit, used without reference to an explicit ES framework, yet are indicative of organizational environmental priorities. ES values are stakeholder- and context-specific, with various land development actors and municipalities holding diverse views on different ES. Results suggest that ES values are influenced by ES drivers, particularly local ES demand and professional profile. These ES values then influence the type and design of GI approaches implemented into practice.

In addition to ES values, we identify numerous constraining factors inhibiting the implementation of GI into urban development. Barriers can be characterized into three categories: institutional, financial, and physical. Institutional barriers manifest in the public sector when there is reluctance to accept new, innovative approaches, and when there is a disconnect between high-level policy and on-ground design standards. Financial barriers are two-fold, and pertain to costs of construction, which is the responsibility of the developer, and cost of maintenance, for which the municipality is responsible. Lastly, physical barriers due to climate, soil conditions, and lack of space can further disincentivize new approaches from being explored.

We end by providing insight on how the uptake of the ES concept into urban governance could improve the uptake of GI. By acknowledging what is desired of nature, GI can be designed to deliver these critical ES. Furthermore, consolidating various stakeholder perspectives is required to holistically implement GI through urban land development. Our study highlights the importance of engaging private sector actors alongside municipal officials to provide a holistic understanding of land development processes in urban planning.