Ecological connectivity potential of brownfields in the Global South: an analysis of the reclamation of former landfills in the São Paulo Metropolitan Region (Brazil)

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Abstract In metropolises of the Global South characterised by accelerated and fragmented urbanization processes, brownfields can constitute obstacles to both urban development and ecosystem maintenance. Mainly located in urban areas with higher social vulnerability, brownfields are underused lands that, due to the extensive use of natural resources by former human activities (such as industries, gas stations, and landfills), now face changes in environmental quality and are potential sources of soil, groundwater, and surface water contamination.

Given the necessary intervention and reclamation of these sites to contain risks to human and ecological systems, they represent opportunities for urban redevelopment and ecological connectivity. From the perspective of environmental planning and landscape ecology, the reclamation of brownfields requires a multi-scale approach integrated with green infrastructure, favouring the connection and expansion of vegetation fragments, gene flow circulation, and urban habitats restoration.

This study aims to analyse the potential of ecological connectivity through brownfields reclamation, specifically considering former landfills, and their integration with the green space system of the São Paulo Metropolitan Region (Brazil). Furthermore, it seeks to highlight challenges and opportunities of integrating brownfields with green spaces in a highly urbanised context, emphasising benefits to the population and the environment.

This investigation is based on a multi-scale cartographic analysis, through the mapping of former landfills and the green space system of the São Paulo Metropolitan Region, which encompasses protected green areas, remnants of native vegetation, and the water network. Thus, areas for prioritised actions and possible configuration of greenways are identified, considering the urban context of these brownfields and their connection with the green space system.

As a result, this research indicates the potential of reclaimed landfills in preserving and expanding vegetation fragments. The appropriate insertion of vegetation in these areas, with specific care taken to stabilise slopes and maintain drainage and collection systems for leachate and gases produced by solid waste disposal, not only contributes to the maintenance of ecosystems, but also has the capacity to increase urban resilience to climate change and promote environmental justice, as it redistributes ecosystem services in cities. It is expected that this contribution can broaden discussions on mitigation and adaptation strategies to climate change in Global South cities, towards a sustainable urban development.