The value of green roofs and walls: Incorporating investors/users preferences in cost-benefit analysis

Summary

Green roofs and walls play a central role in addressing global challenges stemming from the very hostile scenario of climate change and environmental degradation. However, their potential for urban regeneration remains largely unexploited, mostly owing to financial concerns. Even though economic evaluation tools have been increasingly applied to assist private investors and city planners in strategic decision-making, the assessment of green infrastructure is far from complete due to several constraints in measuring important social and environmental services.

This thesis aims to enhance financing decisions by developing a comprehensive and systematic methodology for assessing the value of green infrastructure. The research was conducted in two complementary strands, comprising: (i) the categorization and appraisal of all impacts of green infrastructure, regardless of the possibility of monetization, and (ii) the modeling of users/investors' preferences to weigh those impacts differently. The first contribution of this thesis comprises a methodological framework for economic assessment, balancing the benefits with the underlying extra costs from a life cycle perspective. The evaluation process is incremental at three levels, considering the financial, economic and socioenvironmental contribution of green roofs and walls. The study also comprises investigations about the possibilities for monetizing direct and indirect building and urban scale impacts, adjusting monetary values to the specifications of each project, including buildings characteristics, type of green system and local conditions such as climate. (…)

Overall, the research developed in this thesis proved that despite the high costs, green infrastructure can be preferable to traditional building solutions if all benefits are considered, bringing evidence of the social interest and the real economic contribution of these solutions. Emphasis is given to urban infrastructure improvements in terms of properties appreciation. This is one of the main attributes of green infrastructure and was also further investigated in this thesis considering the willingness to pay of Portuguese consumers. Also, this work delivered a wealth of structured data on the costs, benefits and economic efficiency of the different types of green systems. Ultimately, the findings in this study will improve the assessment of green infrastructure and enable a more robust and informed planning of optimal strategies for buildings retrofitting. This is important to promote the widespread of urban greenery and foster public discussion with regard to the importance of environmental protection and social well-being, which does not necessarily preclude economic growth.

Keywords

Green roofs/walls, economic assessment, modeling preferences, costs/benefits monetization, decision analysis, sustainable urban regeneration.

Passeio dos Clérigos featuring a green roof (Porto, Portugal).

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