



Research Summary

A Framework for Quantitative Assessment of the Environmental, Social and Economic Benefits of TDOT Infrastructure Projects



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WHAT WAS THE RESEARCH NEED?

To develop a methodology for TN that incorporated the adoption of GI practices by many state departments of transportation (SDOT) in the United States which aims to meet sustainability goals, promote economic development, enhance traffic safety, and improve quality of life.

WHAT WERE THE RESEARCH OBJECTIVES?

1. To generate a database of GI practices with attributes detailing the applicability and benefits of each possible GI, to be used as a reference for the proposed framework.
2. To identify and evaluate the existing approaches to quantify and monetize the social and environmental benefits of GI and LID in infrastructure planning and decision-making processes.
3. To propose a systematic and comprehensive framework that integrates environmental, social, and economic impacts of infrastructure projects.

WHAT WAS THE RESEARCH APPROACH?

To apply the AHP and MCS techniques to capture the randomness and hierarchy of social and environmental benefits in GI and LID projects and develop a practical calculation model.

WHAT WERE THE FINDINGS?

Green infrastructure (GI) has the potential to serve as a cost-effective solution for fulfilling transportation infrastructure requirements while enabling SDOTs including Tennessee to maximize the value of their investments in infrastructure by generating various environmental, economic, and social benefits.

The implementation of GI in transportation projects has been successful in addressing stormwater management challenges, and an increasing number of projects are adopting a mix of both green and gray infrastructure to lower the overall costs of compliance with stormwater management regulations.

IMPLEMENTATION AT TDOT

An evaluation tool and instructions has been developed to measure GI improvements incorporated in TDOT projects. Addressing data gaps in the current literature is crucial for developing effective decision-making frameworks that incorporate the social, environmental, and economic impacts of green transportation infrastructure. Future research could focus on developing standardized and objective metrics for quantifying the social and environmental benefits of green transportation infrastructure, incorporating stakeholder input systematically, accounting for temporal and spatial variations in impacts, and developing robust models that can account for the complexity of the infrastructure system.

MORE INFORMATION

Link to the final report: https://www.tn.gov/content/dam/tn/tdot/long-range-planning/research/final-reports/RES2022-02%20Summary_Report.pdf