

OPTIMIZATION OF URBAN TREESCAPE PLANNING: A CASE STUDY IN HO CHI MINH CITY

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Introduction

Street trees play a vital role in urban green infrastructure, improving air quality, ameliorating urban heat, conserving energy, and optimizing rainwater management. Nonetheless, the adverse effects of urbanization on roadside trees, particularly in densely populated areas with constrained space for tree cultivation, pose a significant challenge. As a result, solving the conflict between trees and infrastructure is imperative, giving precedence to fostering the robust growth of trees and enhancing the thermal comfort benefits. Furthermore, the lack of strategic planning, pertinent data, and comprehensive policies may exacerbate the decline in urban tree density, underscoring the necessity for the enhancement and supplementation of existing guidelines. This study endeavors to comprehensively examine Vietnam's current roadside trees policies and guidelines, and the status of street trees in HCMC. By identifying the encountered challenges and presenting viable solutions, the objective is to refine urban treescape planning.

Research questions:

1. What is the current status of existing street trees in HCMC in terms of their health, characteristics, benefits, and negative impacts?
2. How is the street tree planting policies and guidelines followed in Vietnam and other countries?
3. What are the best practices for designing roadside planting that cities in Vietnam, particularly HCMC can refer to solve the existing problem?

Methodology

To determine the impact of street trees on thermal comfort, researchers use the SOLWEIG program to simulate cooling efficiency and evaluate any negative effects on infrastructure using damage listing. Focuses on key factors identified in literature reviews of street tree guidelines in Vietnam and other countries to determine best practices for Vietnam. A site survey is conducted to understand the current state of roadside trees and assess adherence to guidelines. Case studies of experimental research and programming simulations are also included to support optimization proposals. Qualitative data is collected through observational site studies and analyzed using various methods to derive knowledge for scenario-building studies.

Site study areas:

- Ba Thang Hai street, District 10 (NE-SW). Main road. Has more than 50 years mature tree, and reports of tree falling.
- Hung Vuong street, District 5 (NE-SW): local road. Facing the same problem as 3 Thang 2. Has overhead utilities at one side of the pavement.
- Dang Van Bi street, Thu Duc city (NW-SE): 22m width local road. Narrow sidewalk and has overhead utilities on both sides.



Recommendation for Vietnam street tree legal framework

Vietnam's street tree policies and guidelines can be enhanced in various ways:

Urban tree planning: requires a long-term strategic approach. A precise definition of roadside trees is needed, and planting should only occur after other infrastructure construction steps have been completed. Cooperation in designing and managing construction work above or below the sidewalk is essential to avoid sidewalk dug-ups and tree root growth. An official inspectors' agency with knowledge of trees and legal frameworks is necessary for quick action.

Tree species selection: promoting biodiversity. Providing adequate information on suitable tree characteristics and publishing lists of trees and vegetation suitable for different planting conditions are also important. Considering sunlight reference and additional information on soil volume, soil pH, pest and disease resistance, and life-cycle patterns for tree selection guidelines.

References

Huang, X., Li, C., Zhuang, Z., 2021. Analysis of Height-to-Width Ratio of Commercial Streets with Arcades Based on Sunshine Hours and Street Orientation. Green Blue Urban 2018, "Street Tree Cost Benefit Analysis," <https://greenblue.com/gb/resource-centre/street-tree-cost-benefit-analysis/>

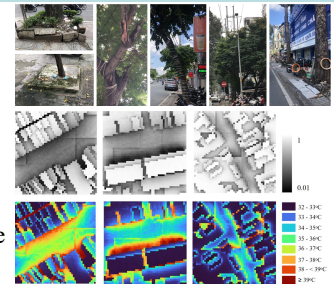
Planting work: clear limitations on available space for planting roadside trees, considering street direction, width, and building height, and applying the H:W ratio for tree placement and canopy coverage.

Maintenance work: standardizing guidelines for tree protection zones during construction, building priority tree records, and establishing categories for judgment. Zoning and classifying areas based on the level of threat and building maintenance programs for each tree type are important. Building a database for existing trees' ULE, adding clearance envelopes into the scope of maintenance work, and establishing and applying Amenity Tree Valuation (ATV). A full-pack guideline for tree and sidewalk solutions, training skilled workers.

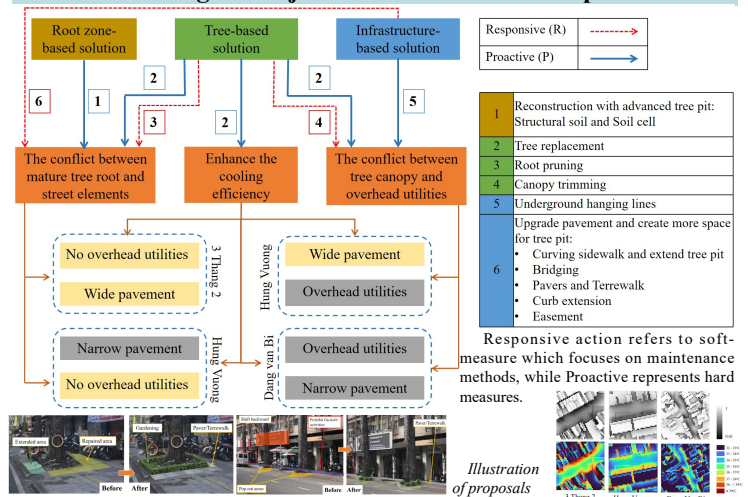
Community engagement: raising awareness about tree benefits and proper tree protection; mobilizing financial support and contributing space for public greening or reserve private trees for shade, participating in tree development and conservation.

The evaluation on current status of roadside trees in HCMC

- The presence of minor defects.
- The guidelines are partially addressed.
- Constrained environment for trees growing.
- Mature tree roots consequence on infrastructure damage.
- High cooling demand and moderate efficiency .



Challenges - Objectives and Solutions Proposal



Discussion and Conclusion

Overall, Vietnam has published sufficient instructions for general street tree planting. Financial investment in urban tree development projects is also recommended, with the government encouraging both domestic and foreign organizations to invest in urban tree projects. Establishing an official communication channel and cooperation among legal entities to standardize guidelines on roadside trees and other street elements.

It suggests integrating technology, establishing a comprehensive street tree database, and establishing a dedicated team of inspectors.

Further research is needed to develop a comprehensive approach to improve cooling effects that can be applied to specific street conditions.

The study has limitations on study areas, reliance on observation for tree health assessment, insufficient statistical data, and the absence of detailed information like annual weather data.

Further research is needed to develop effective measures for controlling violations related to street trees by residents.