The Key Role of Trees in Urban Transport Infrastructure

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trees & transport :: better partnering?
credit: American Planning Association
canopy of a city = multiple services & benefits
urban forestry and urban greening
‘metro nature’

economic value of street trees
# Yard & Street Trees

<table>
<thead>
<tr>
<th>Value</th>
<th>Increase</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2%</td>
<td>mature yard trees (greater than 9-inch dbh)</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>larger street trees (up to 100’ away)</td>
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<tr>
<td></td>
<td>3-5%</td>
<td>trees in front yard landscaping</td>
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<tr>
<td></td>
<td>6-9%</td>
<td>good tree cover in a neighborhood</td>
</tr>
<tr>
<td></td>
<td>10-15%</td>
<td>mature trees in high-income neighborhoods</td>
</tr>
</tbody>
</table>

**multiple studies:**

Green Cities: Good Health > Local Economics
Local Government Benefits

Civic Investment – Public Goods like schools, emergency response, roads

- street trees average positive effect on house values
- added up across Portland, Oregon
- yields a total value of $1.35 billion
- potentially increasing annual property tax revenues $15.3 million

Donovan & Butry. 2010. Landscape and Urban Planning
urban forestry and urban greening
‘metro nature’

economic value of trees in retail districts
Trees & Retail Environments Research

Trees & Shopper Environments Research

• Research Questions •
  trees and visual quality?
  trees and consumer behavior?
  trees and product pricing?

• Methods:
  mail out/in surveys
  national or local sample
  residents/nearby city residents

partners: U of Washington, NGOs, business organizations
funded by USDA Forest Service
Image Categories (sorted by ratings)

Scale: 1 = not at all, 5 = like very much, 26 images

Pocket Parks
mean 3.72
(highest)

Full Canopy
mean 3.63
Enclosed Sidewalk 3.32

Intermittent Trees 2.78
No Trees
mean 1.65
(lowest)
(high - 3.72)
1. Place Perceptions
   - Place Character
   - Interaction with Merchants
   - Quality of Products

2. Patronage Behavior
   - travel time, travel distance
   - duration & frequency of visits
   - willingness to pay for parking

3. Product Pricing
   - higher willingness to pay for all types of goods
   - higher in districts with trees – 9-12%
social science of consumer behavior

‘atmospherics’
urban forestry and urban greening
‘metro nature’

human health & wellness benefits
evidence about human wellness & ‘nearby nature’
evidence about human wellness & ‘nearby nature’
Green Cities: Good Health
www.greenhealth.washington.edu

Sponsors:
USDA Forest Service, U&CF Program
University of Washington
NGO partners

thanks!
to U of WA students:
Katrina Flora
Mary Ann Rozance
Sarah Krueger

research review & summaries
Local Economics

Trees in cities are not grown and managed for products that can be bought and sold on markets, but they do provide many intangible services and functions! This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar sums. Then, it shows how nonmarket valuations can support local decision-making.

Fast Facts

- The presence of larger trees in yards and as street trees can add from 3% to 15% to home values throughout neighborhoods.
- Averaging the market effect of street trees on all house values across Portland, Oregon yields a total value of $1.35 billion, potentially increasing annual property tax revenues $15.3 million.
- A study found 7% higher rental rates for commercial offices having high quality landscapes.
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.
- Shoppers indicate that they will travel greater distance and a longer time to visit a district having high quality trees, and spend more time there once they arrive.
Urban Forests and Newborns
the urban natural environment and pregnancy outcomes . . .

10% increase in tree-canopy cover within 50m of a house
= lower number of low weight births (1.42 per 1000 births)

Donovan et al., Health & Place, 2011; similar studies in Lithuania, Vancouver B.C., Munich, Tel Aviv Israel, Spain
Trees & Crime Reduction

- trees in the public right of way are associated with lower crime rates
  - smaller, view-obstructing trees are associated with increased crime
  - larger trees are associated with reduced crime

Donovan & Prestemon. 2012. *Environment and Behavior*
Air quality :: strategic planting

Pugh et al. 2012. Environmental Science and Technology
combatting obesity
moderate activity recommended

parks prescription
Green Streets for Walkability

evidence of lower frustration and higher meditation when moving into the greener streets

Aspinall et al. 2015. The Urban Brain: Analysing Outdoor Physical Activity with Mobile EEG. British Journal of Sports Medicine
Improving Depression

20 adults with major depression walk in a park setting and an urban setting

- 50-minute walks one week apart
- before-after testing:
  - Mood: Positive and Negative Affect (PANAS)
  - Cognition: Backward Digit Span (BDS)

Cognitive and affective improvements after walking in a nature setting

Berman et al. 2012. *Journal of Affective Disorders*
urban forestry and urban greening
‘metro nature’

opportunities for innovation

green streets
complete streets
stormwater management

source: City of Portland, Bureau of Environmental Services
green stormwater infrastructure tools & strategies

= mini parks?

source: Seattle Public Utilities
multi-modal transport

source: www.good.is
Conclusions

• Nearby trees & nature in cities & towns is essential!
• Economic benefits – property value & retail behavior
• Nature supports disease prevention & health promotion for people of all ages
• Evidence? Green Cities: Good Health
• Include trees in transport systems planning
trees = beauty + many benefits
Human Dimensions of Urban Forestry and Urban Greening

featuring research on peoples' perceptions and behaviors regarding nature in cities

Nature and Consumer Environments
Research about how the urban forest influences business district visitors.

Trees and Transportation
Studies on the value of having quality landscapes in urban roadsides.

Civic Ecology
Studies of human behaviors and benefits when people are active in the environment.

Policy and Planning
Integrating urban greening science with community change.

Urban Forestry and Human Benefits
More resources, studies and links

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www.naturewithin.info