USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Pacific Southwest Research Station

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Los Angeles
Center for Urban Natural
Resources Sustainability
Rooted in Research

Tree Ambassadors: An example of socio-ecological research and community engagement

Objectives:

- ✓Socio-ecological systems (SES) theory
- ✓Examples of SES research in urban forestry
- ✓SES research and Tree Ambassadors

Social-Ecological Systems

Can better understand and communicate how the biophysical, socioeconomic, and political systems are related

- Make relevant the relationship between humans and nature
- Things interact “dynamically” and change (space and time)
- These systems are complex, but are adaptable and can be defined by boundaries and processes
- Breaks ‘disciplinary silos’*:* *Interdisciplinary* → *Transdisciplinary*

Cities and Urban Forests are Ideal Social-Ecological Systems!

Highly complex anthropogenic & “natural” systems with pressing problems in unsustainability

“Ecology” *in* cities

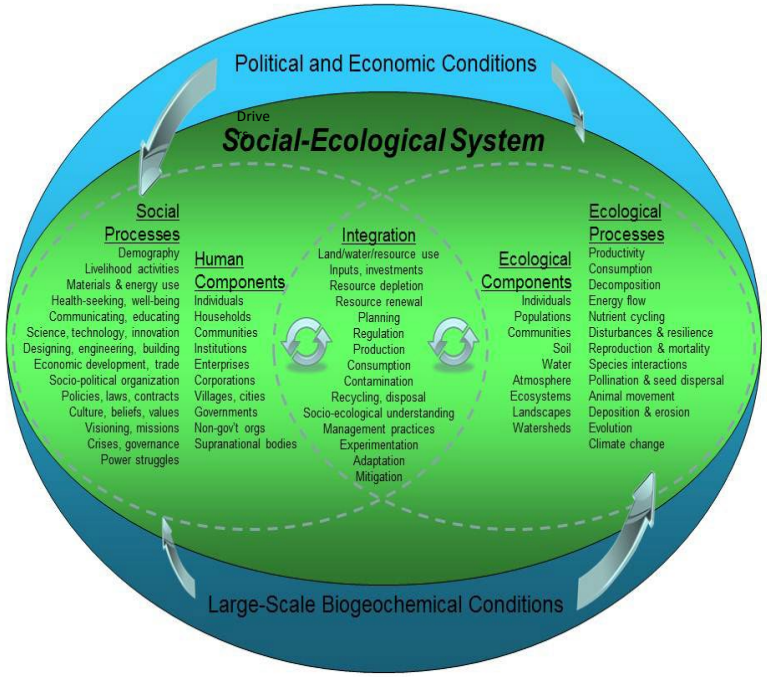
Biophysical environments, soils, vegetation, fauna y humans (e.g., urban ecology)

“….ology” *of* cities

Systems approach to understand multiple social, ecological, environmental economic processes (e.g., Green infrastructure, ecosystem services)

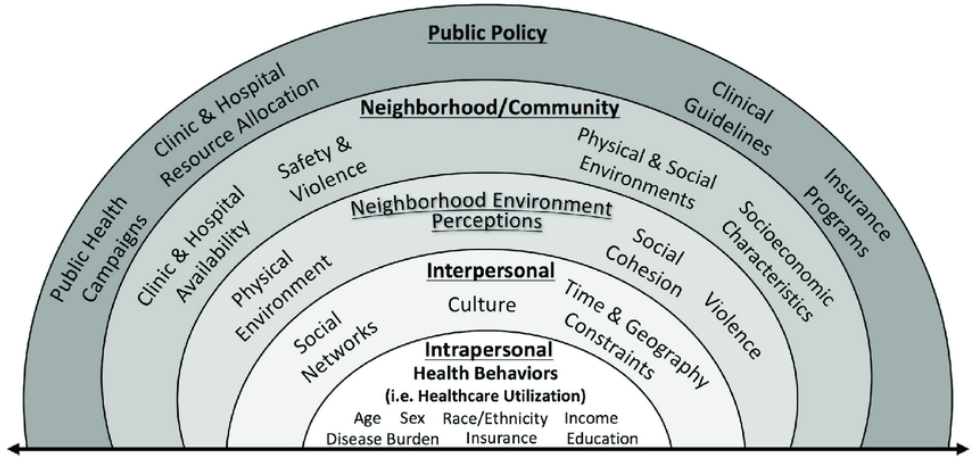
“…ology” *for* cities = Solutions

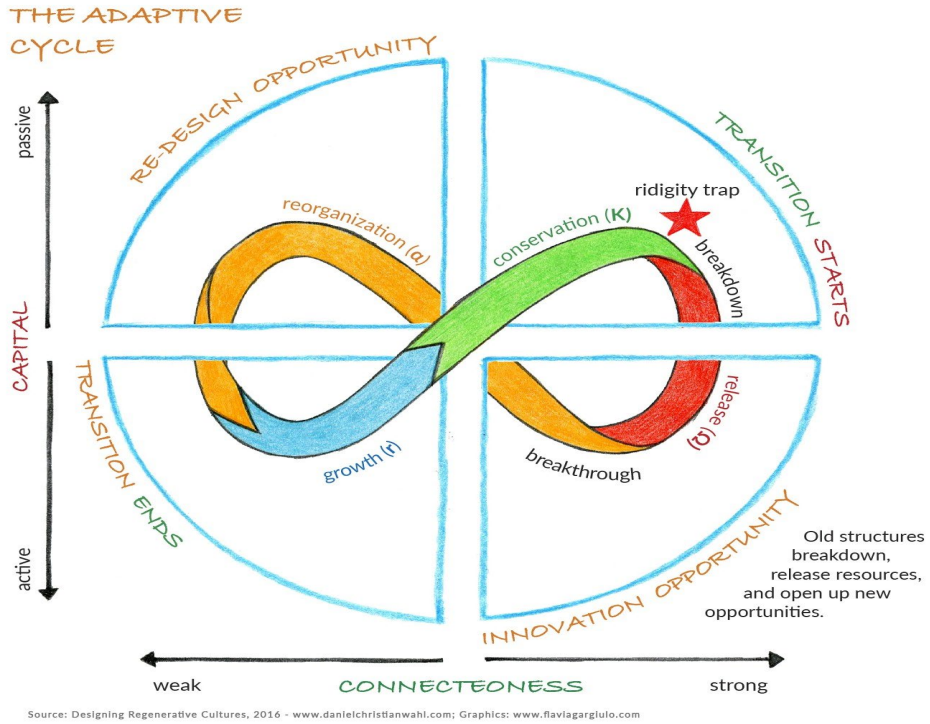
-> Nature-Based Solutions



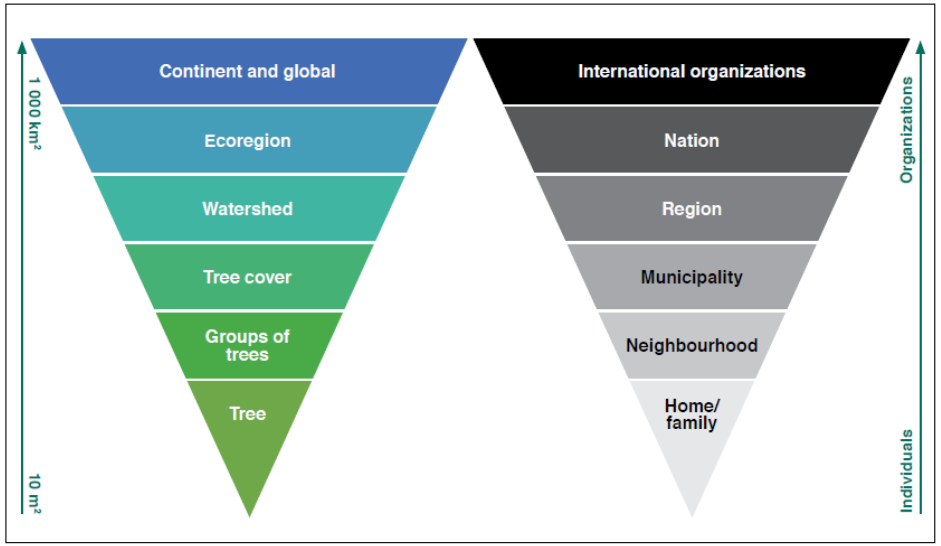
http://snre.ufl.edu/common/images/graduate/SocialEcologicalSystem.jpg

The socio-ecological model for health behavior

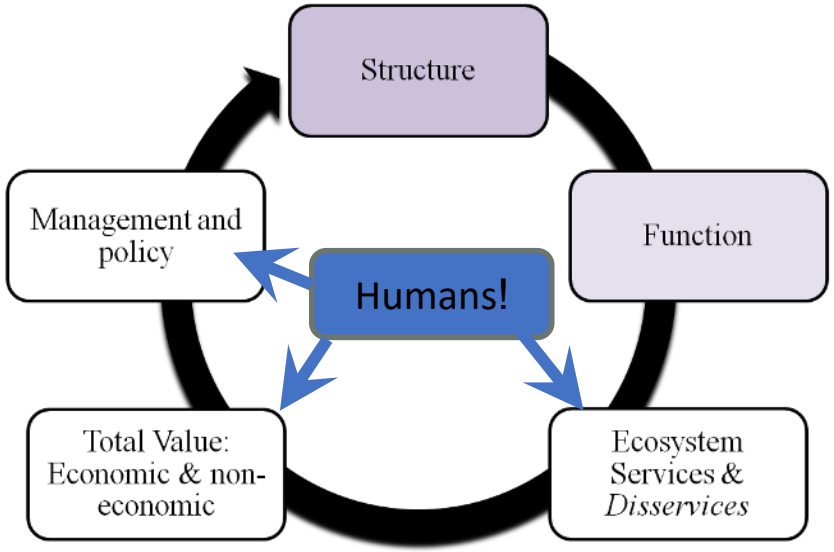




Matching ecological and societal scales



Urban ecosystem services cascade



“Urban Forestry” has a long history of doing this

“…all trees in a city in its broadest sense…. includes trees in parks, private gardens, streets, around buildings, on wasteland, and in existing woodlands..” (NUCFAC)

Landscape and Urban Planning, 13 (1986) 29–44
Elsevier Science Publishers B.V., Amsterdam – Printed in The Netherlands

HUMAN RESPONSES TO VEGETATION AND LANDSCAPES

ROGER S. ULRICH

Department of Geography, University of Delaware, Newark, DE 19716 (U.S.A.)

(Accepted for publication 27 August 1985)

ABSTRACT

Ulrich, R.S., 1986. Human responses to vegetation and landscapes. *Landscape Urban Plann.*, 13: 29–44.

The rapidly expanding research record concerning aesthetic, emotional and physiological response to visual landscapes is summarized, with emphasis on aesthetic preferences for views containing trees and other vegetation. The survey is set within a conceptual perspective suggesting that affective responses such as aesthetic preference are central to a landscape observer's thoughts, conscious experience and behavior. Substantial progress has been made in developing models that relate aesthetic responses to specific visual properties of environments. When aesthetic preferences are compared for urban and unspectacular natural views,

Journal of Arboriculture 6(11): November 1980

THE CONTRIBUTION OF TREES TO RESIDENTIAL PROPERTY VALUE

by Dominic J. Morales

Abstract. This study was conducted to determine whether or not trees contribute to residential property value and the extent of that contribution in the areas observed. To accomplish this, homes were observed with a substantial amount of mature tree cover and homes were observed without tree cover. It is realized that there are other variables that contribute to residential property value and this information was obtained from tax cards on file in the town tax assessor's office. All possible variables were noted for each house observed including the sale price. Factor and multiple regression analysis was used to determine the effect of the independent variables on the dependent variable which is sales price of the house. The results showed that trees do contribute to property value in the areas observed. By using the equation formulated by the regression analysis, we can predict the value of homes. From the values derived by the regression analysis, it was found that good tree cover added $2,686 (or six percent of the total) to the property value of the homes observed.

Individuals in the field of tree evaluation can easily arrive at and agree upon the value of a tree as it relates to timber use and aesthetic shade value. Formulas have been developed for calculating such values (1).

property without (2).

This study is directed to help narrow some of these discrepancies by developing a methodology which can provide some insight to the problem of tree cover as a contributing factor in residential property value.

Methodology

Sample Selection. The object of this study is to measure the contribution of trees to residential property value. One method of accomplishing this is to observe houses with and without mature tree cover and observe how this affects the sale price of these houses.

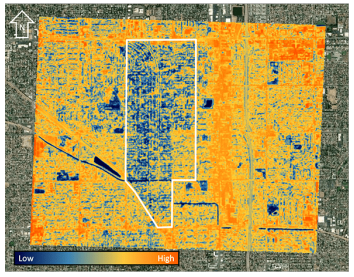
As an initial step in the development of this study, a test area had to be designated. The town of Manchester, Connecticut, was selected. Manchester is a suburban town located southeast of the city of Hartford. As a means of becoming familiar with certain neighborhoods in the test area

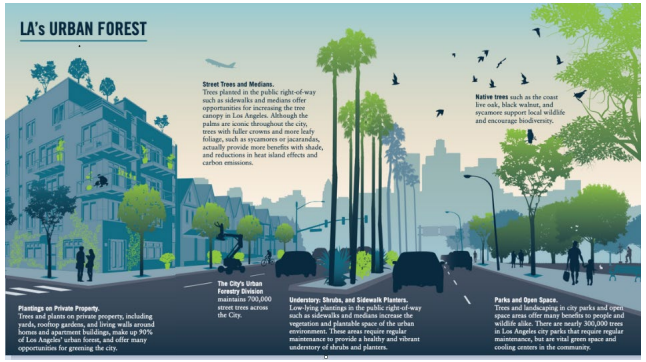
Figure 3. Photos characterizing urban forest structure-ecosystem service/disservice attributes from specific sites in Florida, USA. The pictures above illustrate “high tree shade” (left), “low tree shade” (right).

Referendum 1: Florida Neighborhood Urban Forest Program
(Check one option as the most important and one option as the least important)

Most Important		Least Important
☐	High tree shade	☐
☐	Above US$4,800 increase in property value (more than 3 trees)	☐
☐	Good condition (no poor condition trees)	☐
☐	US$10.00 monthly utility tax	☐

Would you vote for this neighborhood urban forest program? Yes ☐ No ☐



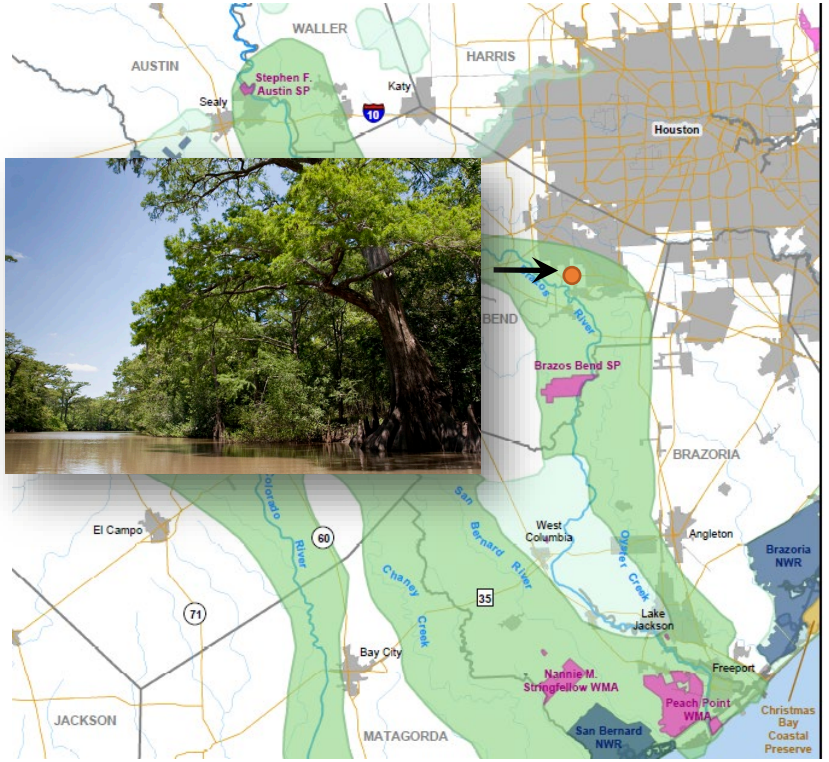


SatVu HotSat-1 imagery, Fresno, California – 31st July 2023 at 21:35 UTC

#1: Ecosystem Services and Environmental **Policy**: **Modeling** Peri-urban Reforestation Project

USA Environmental Protection Agency
"Emerging and Voluntary State Implementation Plans for Ozone Control" Policy

1. *Forest canopy growth-mortality model (30 years)*
2. *UFORE- Air pollution (Nitrogen oxide, ozone)*
3. *Biogenic emissions from trees*
4. *Reforestation costs*



The Nature Conservancy
Protecting nature. Preserving life.™

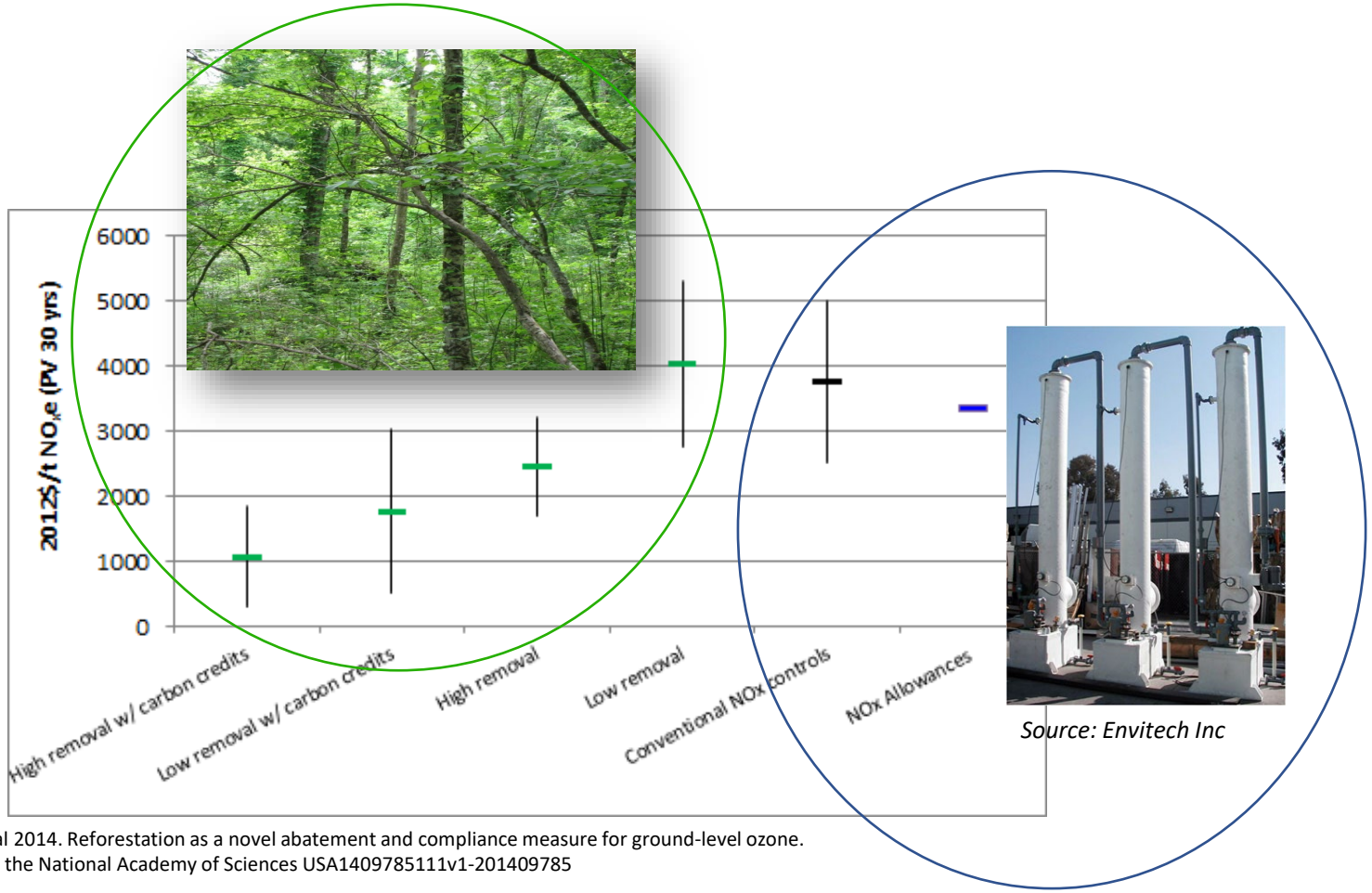
SFRC School of Forest Resources & Conservation

DOW

*Houston, Texas USA

*1,450-ha of peri-urban reforestation

Reforestation More Cost-Effective than Burner and Catalytic Technologies for Ozone Control



Source: Envitech Inc

Kroeger, T, et al 2014. Reforestation as a novel abatement and compliance measure for ground-level ozone. Proceedings of the National Academy of Sciences USA1409785111v1-201409785

#2: Home owner surveys (choice experiment) based on field data, focus groups, and benefit studies

Focus groups in Florida to identify benefits and costs

3 focus groups in Tampa Fl

Designed/ identified Florida relevant studies

Tree Shade –(Pandit and Laband 2010); Property Value (Escobedo et al., 2012); Tree Condition (Koeser et al, 2015); Maintenance Costs (Horn et al., 2012)

Designed 2 choice experiments and Qualtrics stated preference panel surveys

1. Ecosystem service-disservice tradeoffs (n=1,052)
2. Important tree functional traits (n= 724)

Used best worst scaling, Logit, Probit and Latent class modelling

1. Can people value and identify benefits and costs from urban forests?
2. What urban forest characteristics and benefits can people identify in urban forests

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Referendum 1: Florida Neighborhood Urban Forest Program
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☐	Good condition (no poor condition trees)	☐
☐	US$10.00 monthly utility tax	☐

Would you vote for this neighborhood urban forest program? Yes ☐ No ☐

Can people value and identify benefits and costs from urban forests and different tree types?

Study 1 (Tradeoffs)

- Value: Property value > Tree condition >shading
- Prefer programs that cost < $7.00 per month + maintaining good condition trees + provide high shade
- Identify differences between ES from their property vs neighborhoods
- People can discern trade-offs between ecosystem services & disservices

Study 2 (Functional traits)

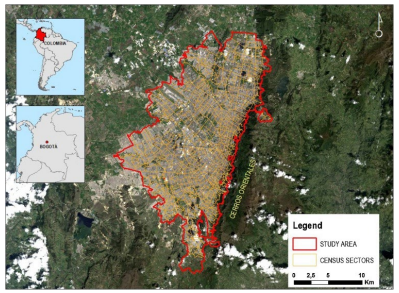
- 4 classes of residents identified; no ‘average’ resident’
- No one size fits all tree planting program exists (context)
  - 1 group (of 4) preferred exotic over native
  - 3 of 4 classes prefer high diversity in types of trees
  - Younger, pro environment; WTP $32/mo to avoid exotic trees

#3: Taking on the Mayor of Bogota, Colombia
(*Using Municipal tree inventory and crime data, statistics & transdisciplinary research*)

Tweets from the former Mayor of Bogotá Enrique Peñalosa

"Park design criteria in north Bogota is that no laborer can play soccer at lunch…they fill them with trees and no one goes"

"In colder cities like Bogota too many trees in parks makes them dark and cold and they scare people"



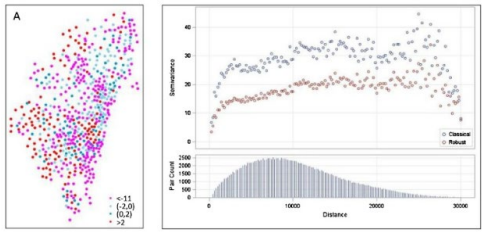


Fig. 2. (A) Spatial distribution of model residuals, and (B) empirical and robust semivariograms of model residuals.

- Fewer homicides occurred in public treescapes with taller trees and higher tree density.
- Overall average treescape height had a strong negative effect on homicides.
- Amount of public green space and basal area were not related to homicide occurrence.

ELSEVIER

Land Use Policy
Volume 78, November 2018, Pages 583-592

Trees and Crime in Bogota, Colombia: Is the link an ecosystem disservice or service?

Francisco J. Escobedo [a], Nicola Clerici [a], Christina L. Staudhammer [b], Alejandro Feged-Rivadeneira [c], Juan Camilo Bohorquez [d], German Tovar [e]

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https://doi.org/10.1016/j.landusepol.2018.07.029

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Tree Ambassador / Promotor Forestal program

“The Tree Ambassador / Promotor Forestal Program is a grassroots, bilingual community organizing program dedicated to amplifying community voices and planting and caring for trees in historically disinvested, heat vulnerable communities in Los Angeles.”

Los Angeles Center for Urban Natural Resources Sustainability Rooted in Research

CALIFORNIA CLIMATE ACTION CORPS

Climate Resolve

TreePeople

UCLA Institute of the Environment and Sustainability

LA CONSERVATION CORPS

CAL FIRE

CITY PLANTS

KYCC

PROP 68

LA DWP

UNIVERSITY OF CALIFORNIA Center for Climate, Health and Equity

Tree ambassador program 2021-2022 (pilot round)

Under-resourced communities tend to live in neighborhoods that have lower tree canopy and are hotter

Audience

- 12 community members in L.A. neighborhoods impacted by urban forest inequity

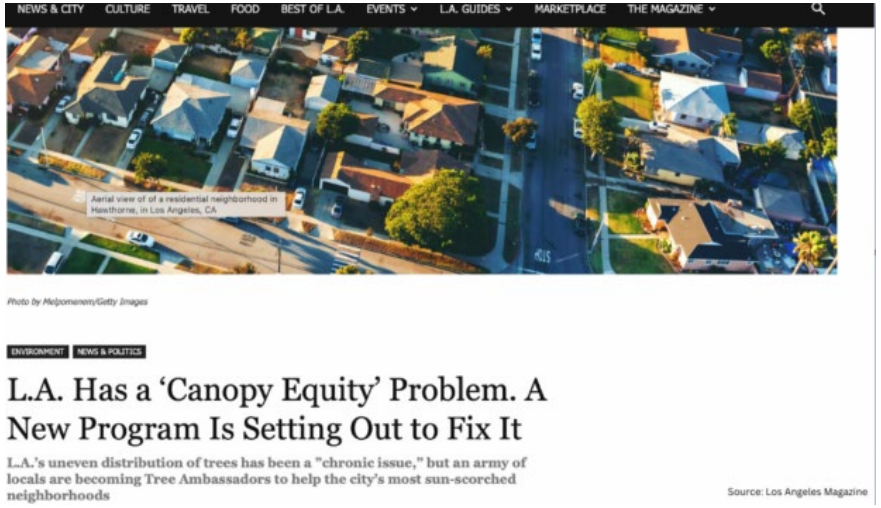
Purpose/ Objective

- 10-month community organizing program to hire and train Tree Ambassadors
- Equip trainees to engage their neighbors to steward trees and to understand and reduce the risks of extreme heat

Research

- Technical assistance/translation, program evaluation, data analysis,

https://www.cityplants.org/tree-ambassador/



research and scientific component

- Framework to link policy goals, governance, resources, and community greening goals in disadvantaged neighborhoods for public health
- Adapted a theory-based, multi-dimensional socio-ecological systems (SES) framework from the public health field to evaluate the Tree Ambassador Program

frontiers | Frontiers in Sustainable Cities

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Check for updates

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to
Urban Greening,

A socio-ecological approach to align tree stewardship programs with public health benefits in marginalized neighborhoods in Los Angeles, USA

Edith B. de Guzman[1]*, Francisco J. Escobedo[2] and Rachel O'Leary[3]

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Socio-ecological contexts of trainees

Tree Ambassador	Neighborhood	% Existing Tree Canopy*	Pollution burden Score**	Heat health action index***
1	Westlake	13%	90	79
2	Pico Union	8%	97	70
3	South LA	10%	89	75
4	South LA	12%	85	77
5	Boyle Heights	13%	87	81
6	Boyle Heights	13%	71	74
7	Canoga Park	26%	68	55
8	Canoga Park	26%	93	64
9	Pacoima, Sylmar	18%	97	61
10	Sunland-Tujunga	26%	67	43
11	Sun Valley	30%	87	54
12	North Hollywood	20%	95	50

*By ZIP code, or numeric average where a neighborhood is made up of multiple ZIP codes, https://www.treepeople.org/los-angeles-county-tree-canopy-map-viewer/.

**Percentile by census tract, with values from 0 to 100 by census tract. Higher values mean higher proportion of disadvantaged individuals per CalEnviroscreen metrics, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40.

***Represents heat vulnerability with values from 0 to 100 by census tract. Higher values mean higher heat vulnerability, https://cal-heat.org/explore.

evaluation activities- Led by Edith de Guzman

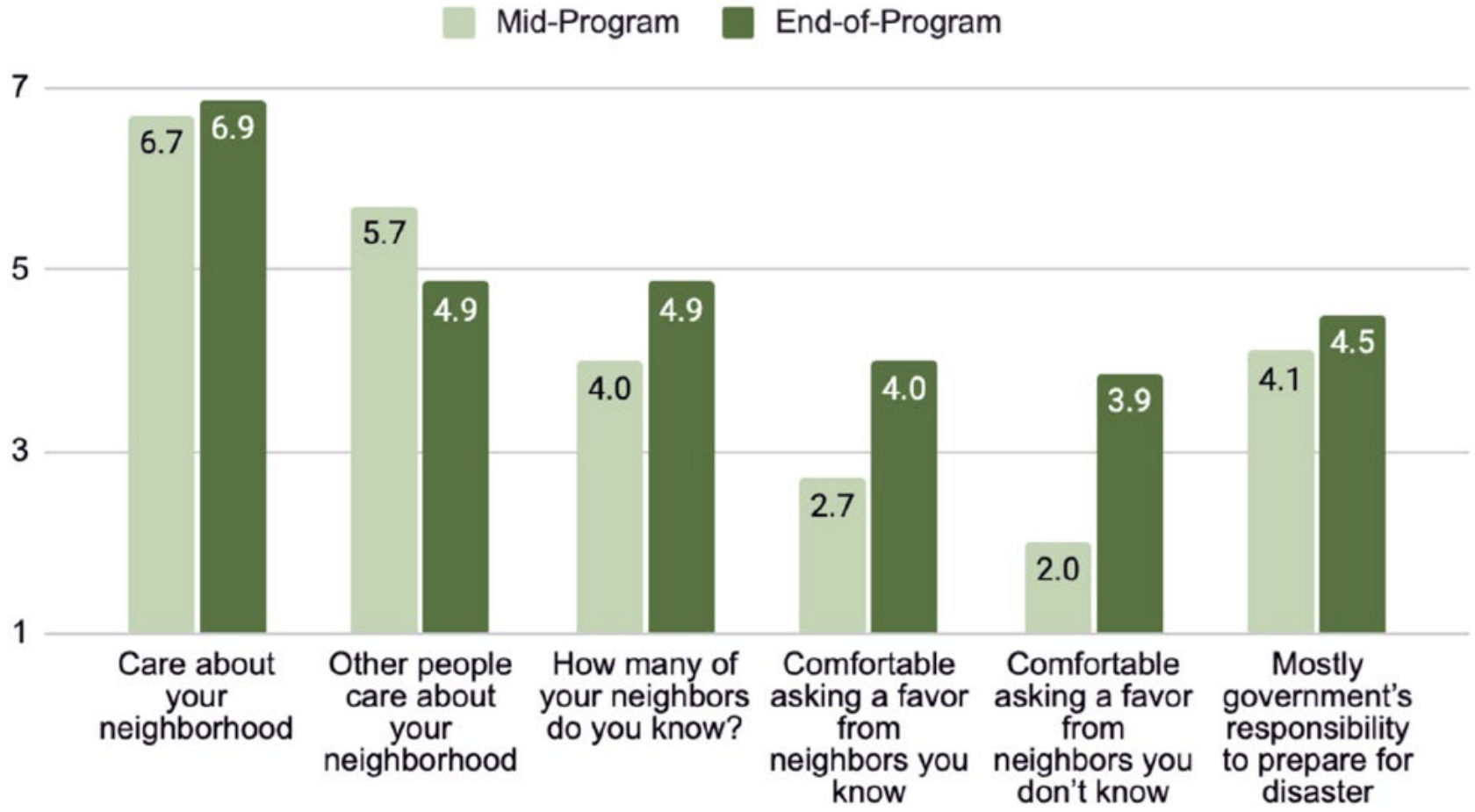
- ✓ **FOCUS GROUP (N=9)**
- ✓ **SURVEYS (N=8)**
- ✓ **INTERVIEWS (N=10)**
- *ETHNOGRAPHIC EVENTS (N=20)*

Tree Ambassador focus group

Francisco Escobedo, Alyssa Thomas and Macy Dreizler | U.S. Forest Service Pacific Southwest Research Station

Photo: City Plants

LONGITUDINAL SURVEY (N=8)



Responses to care and stewardship for the neighborhood, asking neighbors for a favor, and the government's role in preparing for a disaster at mid-point and end-point of the program (1 = strongly disagree; 7 = strongly agree).

results

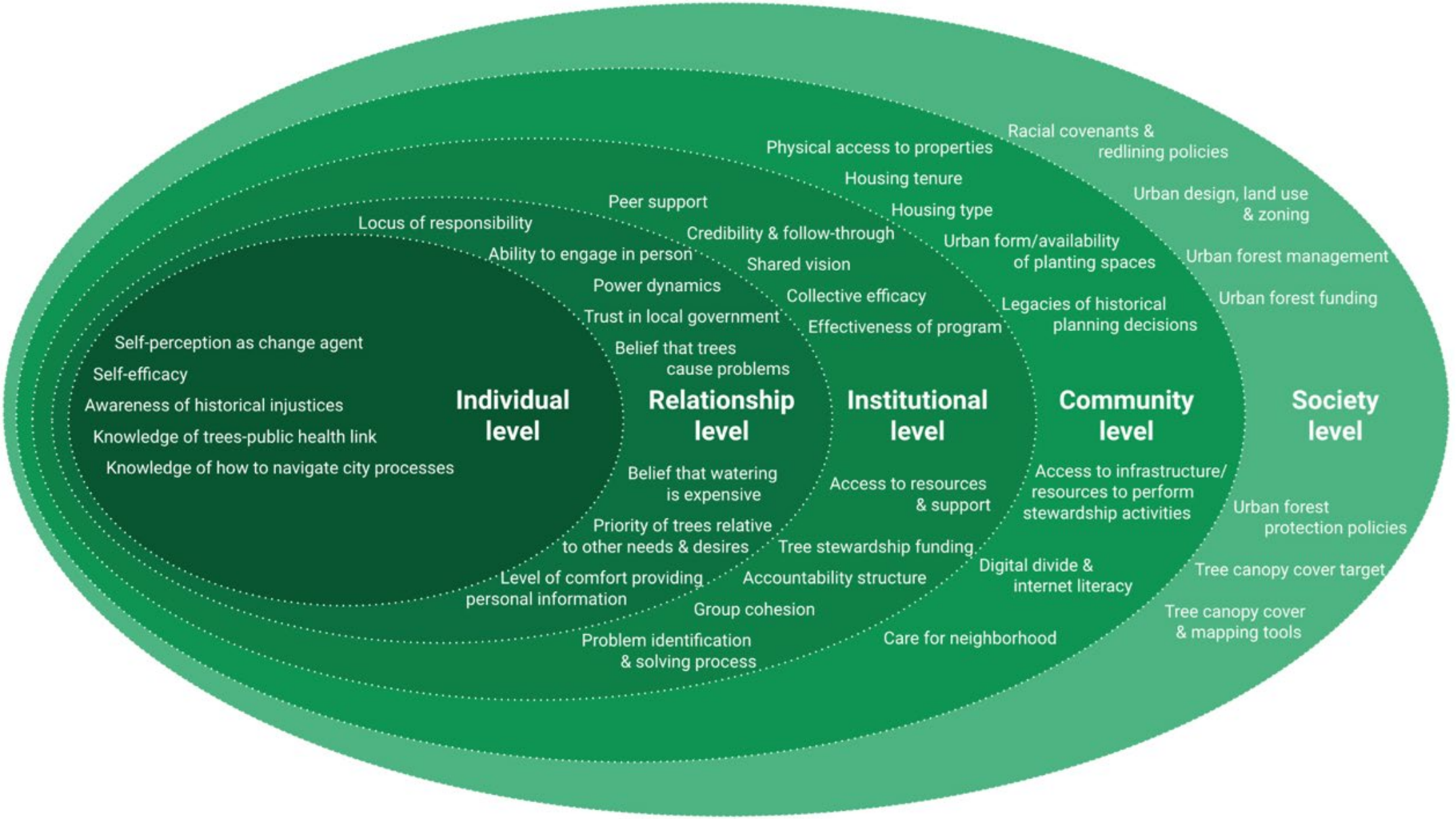
INTERVIEWS (N=10)

“I learned how to be a leader in my community. It allowed me the opportunity to present neighbors with an issue that we could all be part of achieving.”

“I never would've cared as deeply as I do now without knowing these injustices first, because now I can understand the significance of planting a tree.”

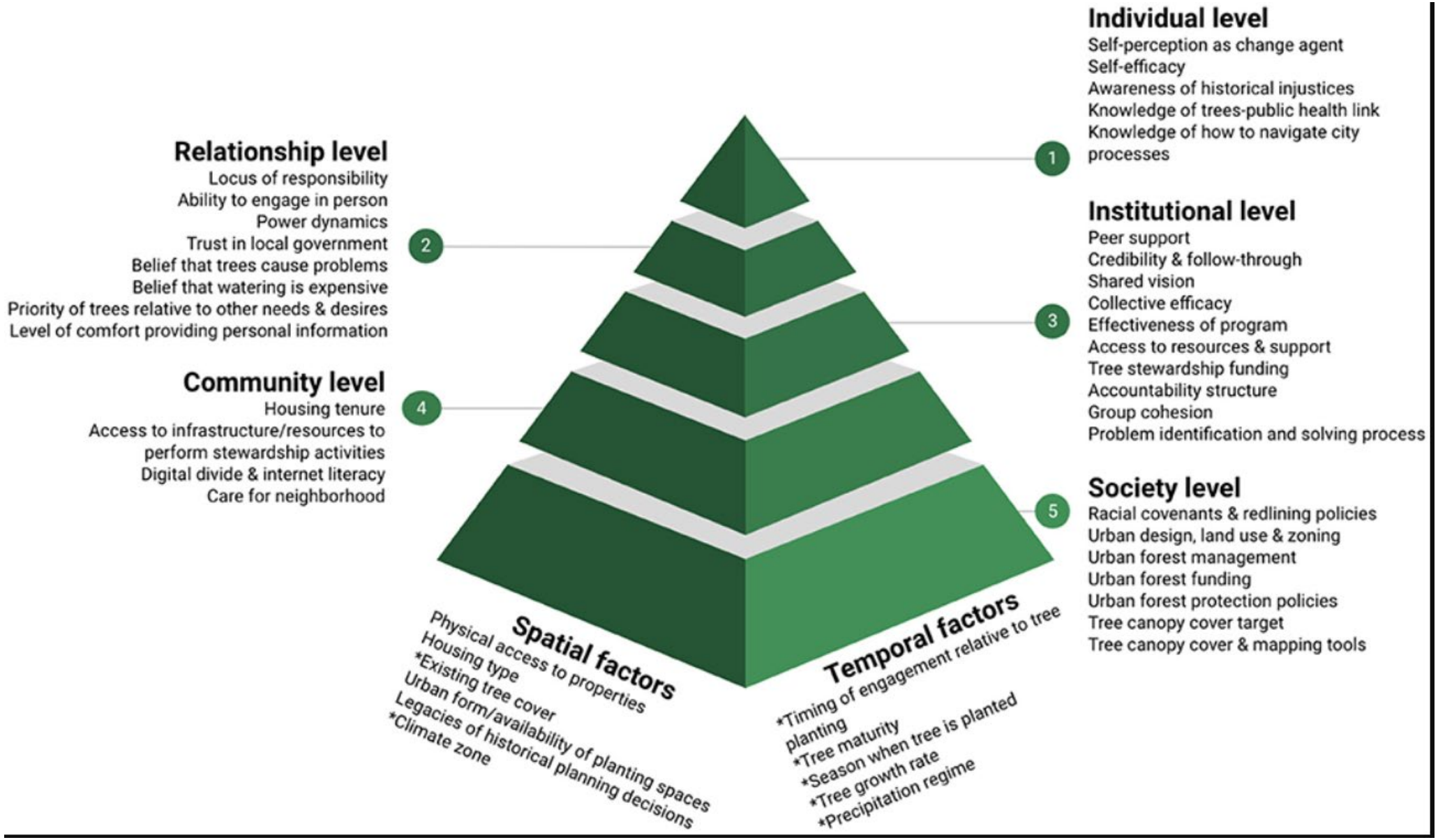
Survey responses: Word cloud exhibiting skills and knowledge learned by trainees during the program.

socio-ecological model of community-based tree stewardship



de Guzman, E. B., Escobedo, F. J., & O'Leary, R. (2022). A socio-ecological approach to align tree stewardship programs with public health benefits in marginalized neighborhoods in Los Angeles, USA. *Frontiers in Sustainable Cities*, 117.

socio-ecological model of community-based tree stewardship



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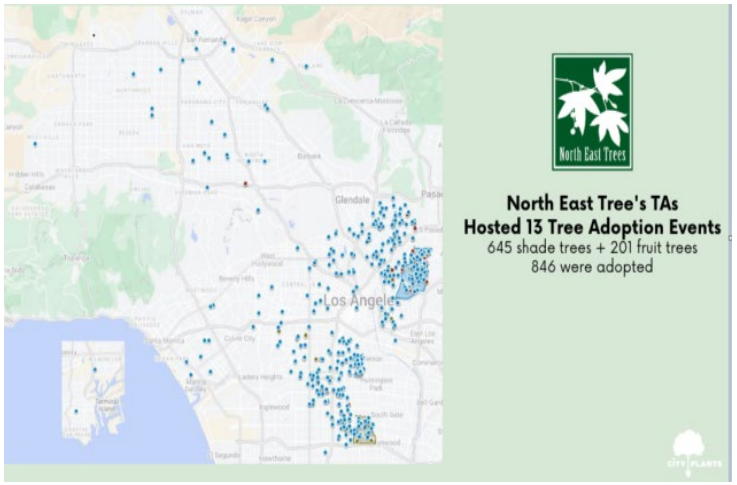
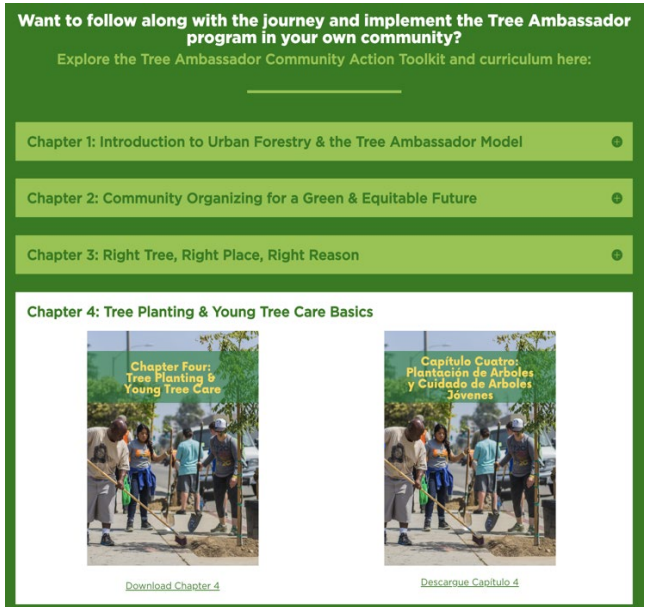
dissemination of evaluation and research findings

PARTNERS IN COMMUNITY FORESTRY CONFERENCE

Arbor Day Foundation





Thank you

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