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Agnese Nelms Haury Program in Environment and Social Justice, Arizona

Equity in Green Infrastructure: A Case Study in Tucson, AZ

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Presented by Adriana Zuniga

The Global Water Security Challenge

Webinar organized by International Water Resource Association

April 16, 2019

Funded by Lloyd's Register Foundation

Led by UWE Bristol University of the West of England

In partnership with Monash South Africa, The University of Arizona Udall Center for Studies in Public Policy

Water security in cities

- **World is becoming urbanized.**
  - By 2050, 70% of the population will be living in cities.
- **Climate change.**
  - Weather and natural resource distribution are more volatile (e.g., more storms and droughts).
- **Urbanization.**
  - Cities are more vulnerable due to rapid urbanization and the expansion of infrastructure.

Houston, TX after Hurricane Harvey

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Green Infrastructure

Definition:

"The creative combination of natural and artificial structures (**blue, green** and **gray**)…

with the intention of achieving specific goals of resilience (flood management, public health, etc.)…

with broad public support and attention to the principle of appropriate technology"

Blue

Green

Grey

(Staddon et al., 2017)

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Nature-based solutions

Green infrastructure plays a critical role in providing the ecosystem services that support livable, resilient and sustainable cities, including:

- Flood control
- Replenishment of aquifers
- Improved water quality
- Reduced heat (shade)
- Local food production
- Improved air quality
- Improved aesthetics
- Increased recreational opportunities
- Enhanced social interaction
- Reduced stress, noise, and overcrowding

Reframing “water as a hazard” to “water as a resource”

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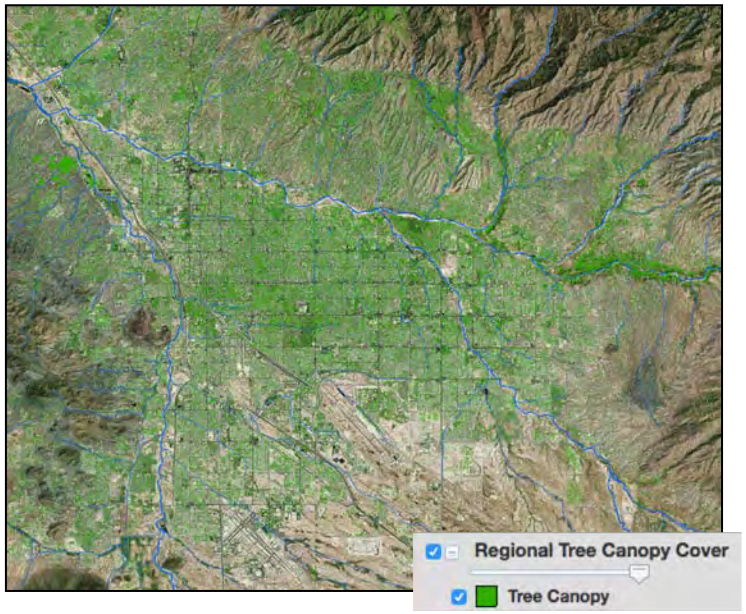
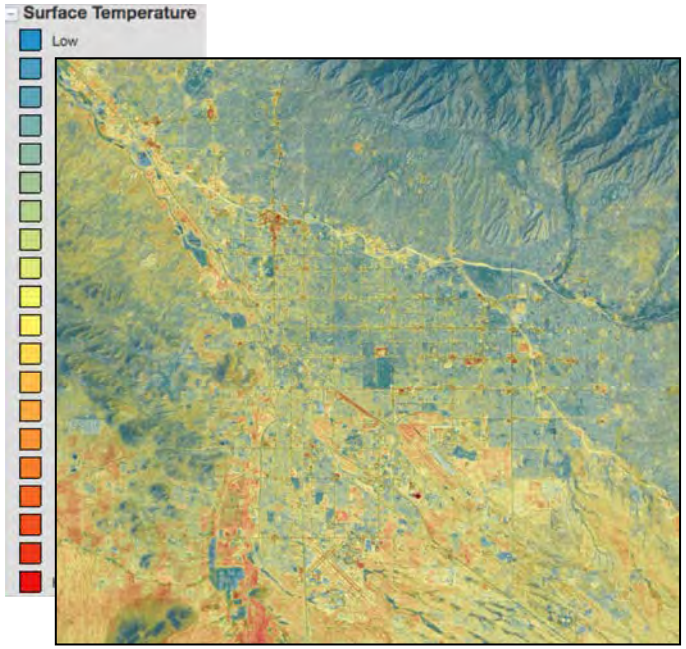
Inequities in green infrastructure in Tucson, AZ





Tree canopy (left) and surface temperature (right) in Tucson, AZ (data from PAG)

Street in the south side of Tucson

Flooding in the south side of Tucson

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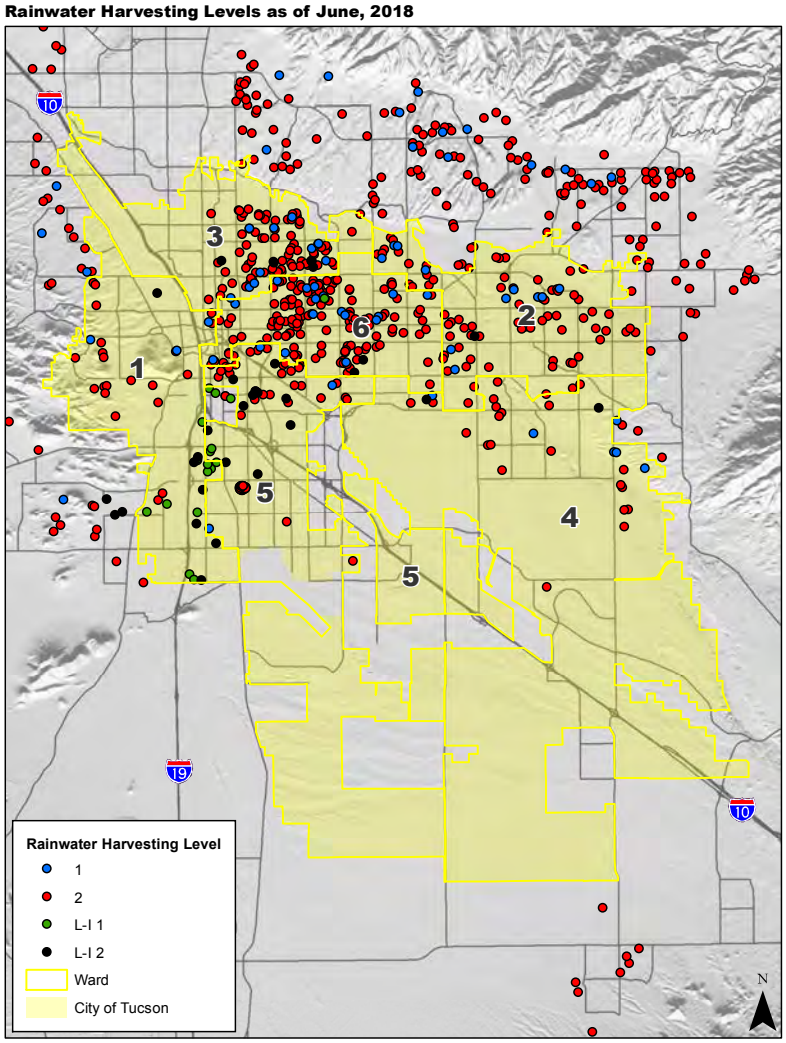
Rainwater harvesting programs in Tucson



June 2018 Data from Tucson Water

The City of Tucson has launched programs and incentives to harvest rainwater, but these have not been implemented in the south side of the city

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Objective

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Program in Environment and Social Justice

To address inequities in green infrastructure funding, siting, and implementation

A collaborative, participatory **community engagement** project to facilitate the design and adoption of green infrastructure demonstration projects in underserved communities in Tucson.

Partners:

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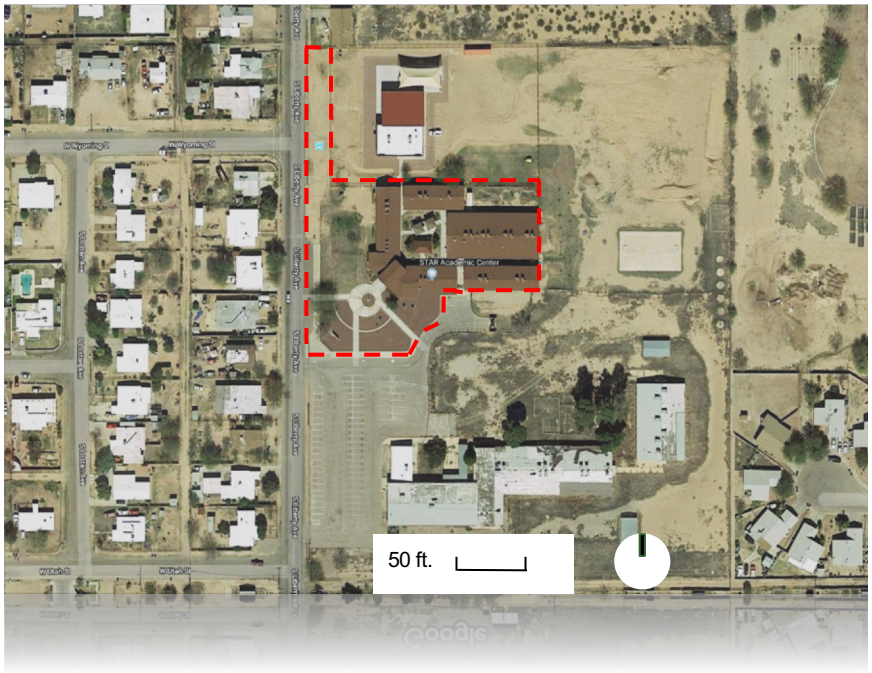
Engagement: STAR Academic High School



Site Location

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Engagement at STAR Academic High School

- Met with school principal and science teacher during summer 2017.
- Given talks to students during the fall 2017.
- UA Landscape Design professor Bo Yang used this site for his design studio class in the spring 2018 (participatory design process)

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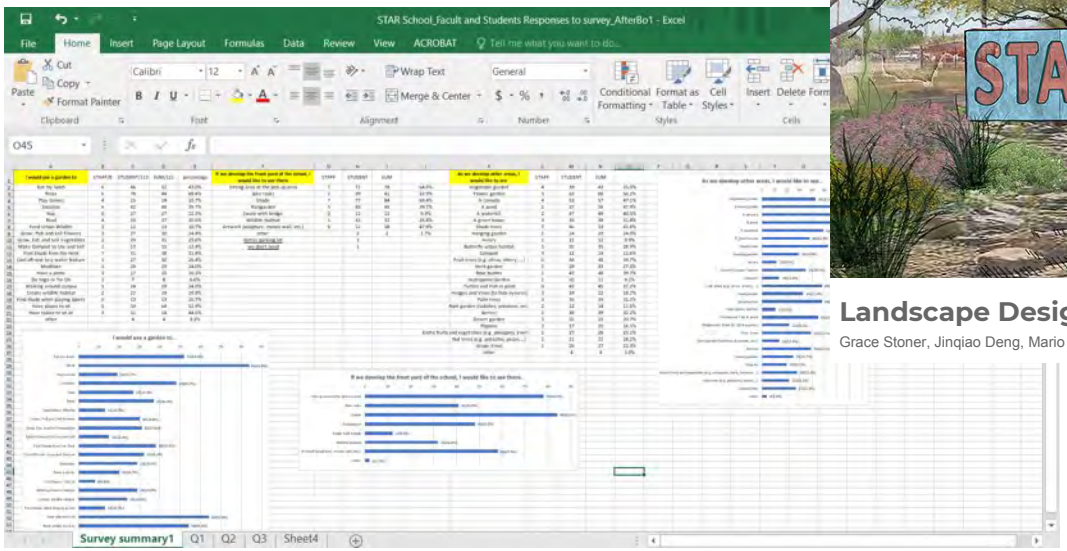
Participatory Design Process

- Collected data through a survey and interviews
- Consulted with the STAR community through the design process



Landscape Design for West Campus

Grace Stoner, Jinqiao Deng, Mario Nuño-Whelan, Penelope Cottrell-Crawford

THE UNIVERSITY OF ARIZONA
College of Architecture, Planning & Landscape Architecture

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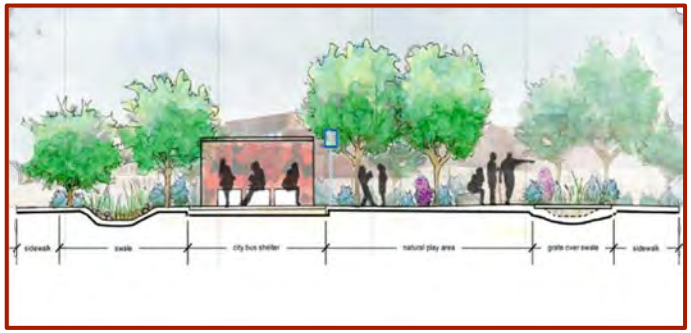
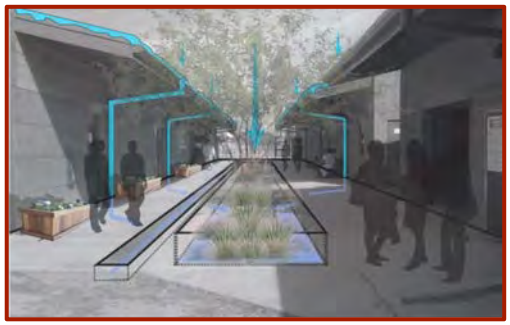
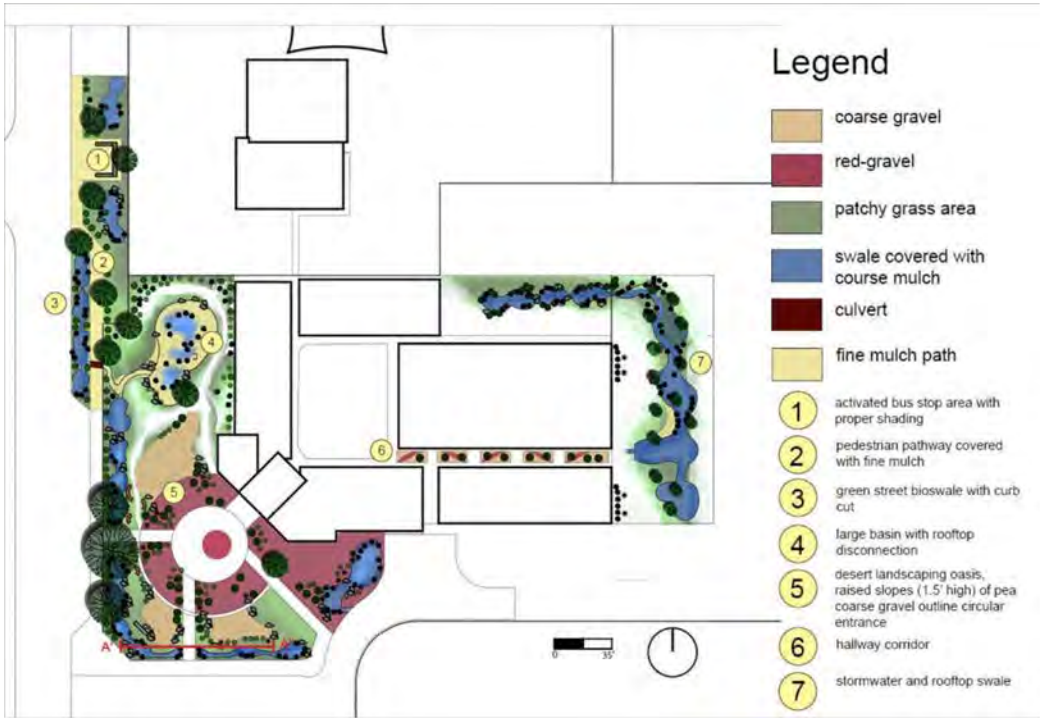
Implementation of green infrastructure

- UA Green Fund gave us $25K to design, implement and evaluate GI at STAR.







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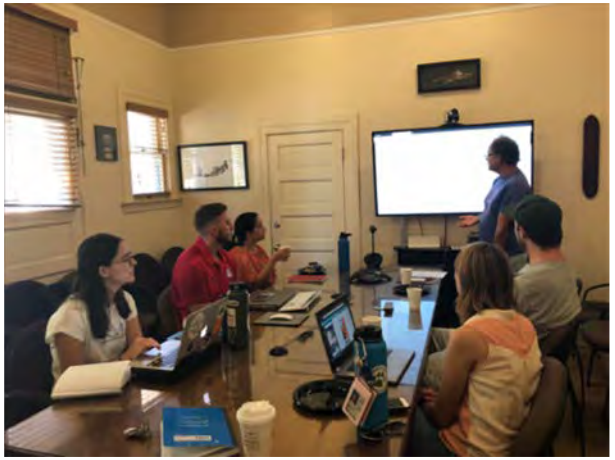
Student engagement efforts

Kickoff meeting in Sept. 2018



Regular meetings with team leaders

We engaged some 32 UA students in planning

- graduate students
- undergraduate students
- Internships
- volunteers

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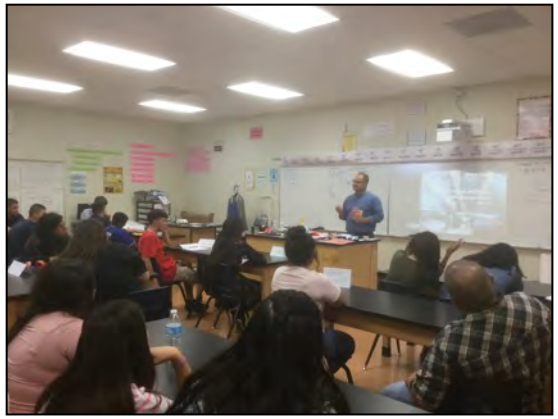
Student engagement efforts

We engaged about 80 STAR students

- Science class
- Art class (4 sections)
- JTED class

STAR student working on mosaic



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Student engagement at STAR

We engaged JTED (Joint Technological Education District) students

- used their machinery to dig basins while training STAR students

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The big event: Implementation at STAR

Prep work – delivery of materials

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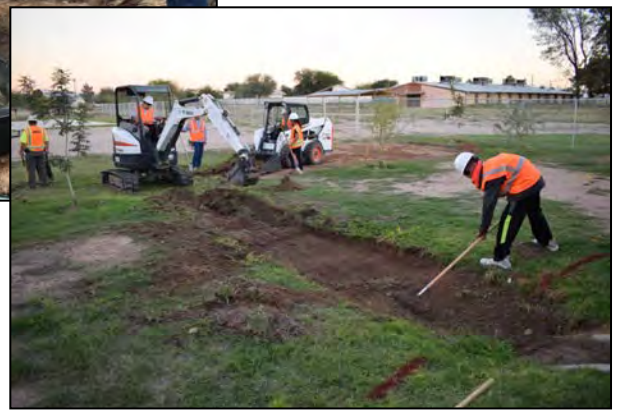
The big event: Implementation at STAR

80 people involved in activities – planting, digging, mixing



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The big event: Implementation at STAR

Before

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The big event: Implementation at STAR

During

International Water Security Network

The big event: Implementation at STAR

After

Security Network

The big event: Implementation at STAR

Before

International Water Security Network

The big event: Implementation at STAR

During

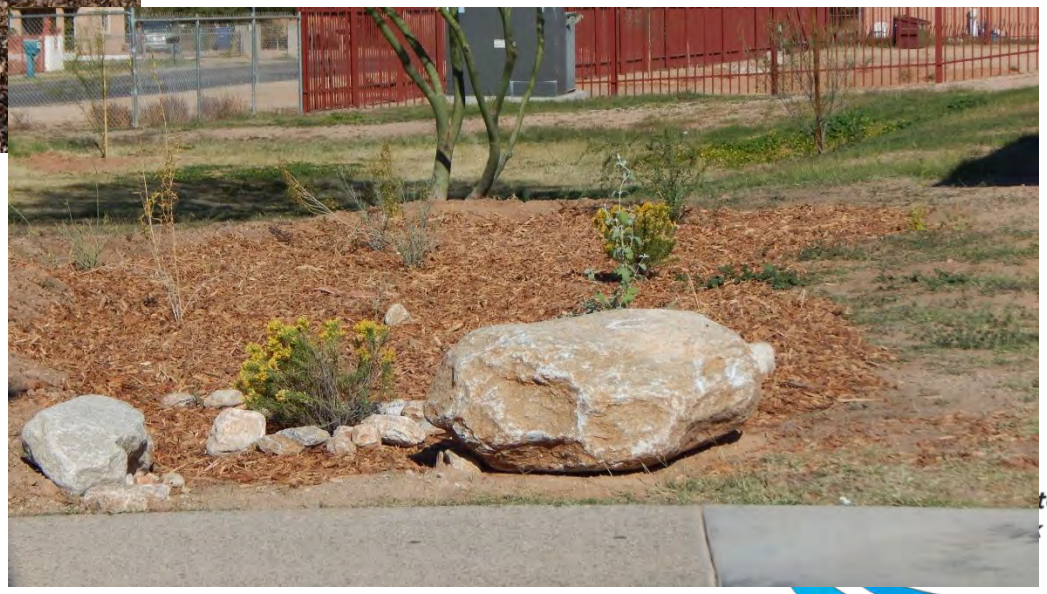
International Water Security Network

The big event: Implementation at STAR

After

The big event: Implementation at STAR

Finished raingardens



The big event: Implementation at STAR

Connecting communities – UA, Star, NGOs, Gov

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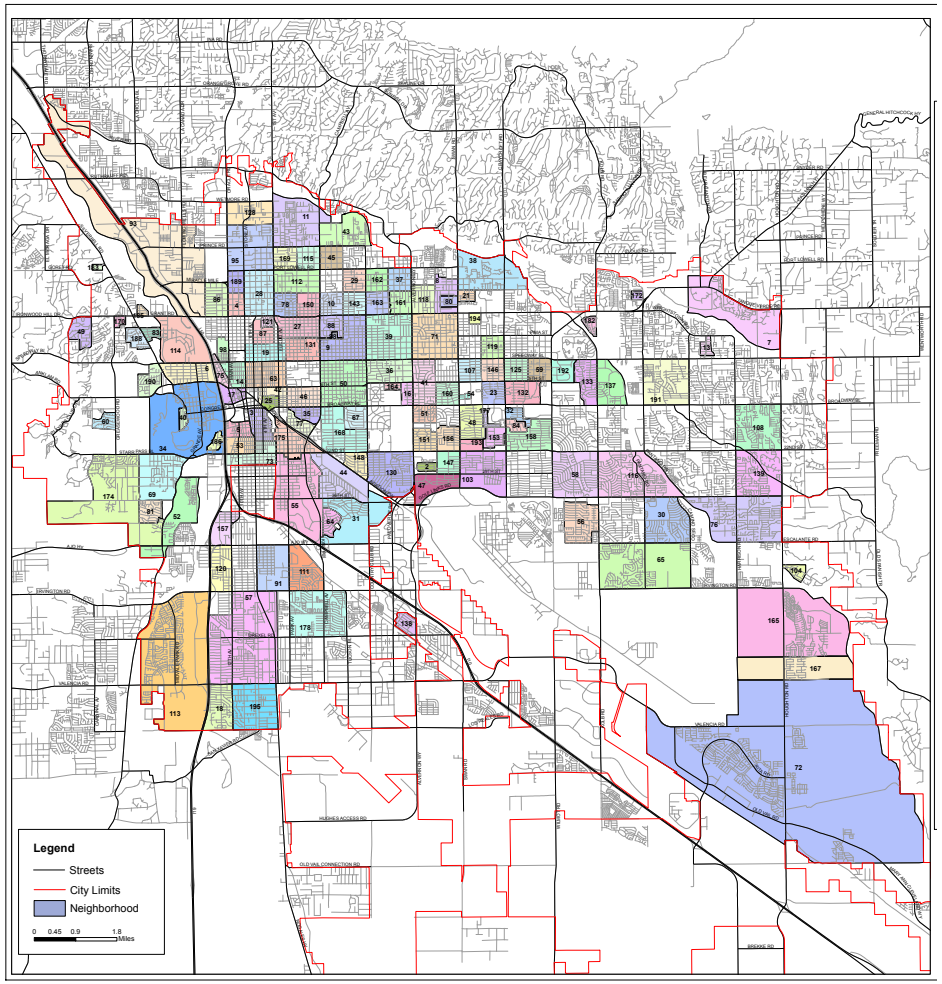
Obstacles to community engagement



Neighborhood associations in Tucson

- **Lack of representation** – no neighborhood associations = no voice in the City.
- **Land tenure** - Most people rent their homes.
- **Immigration status** - Concentration of foreign-born undocumented families.

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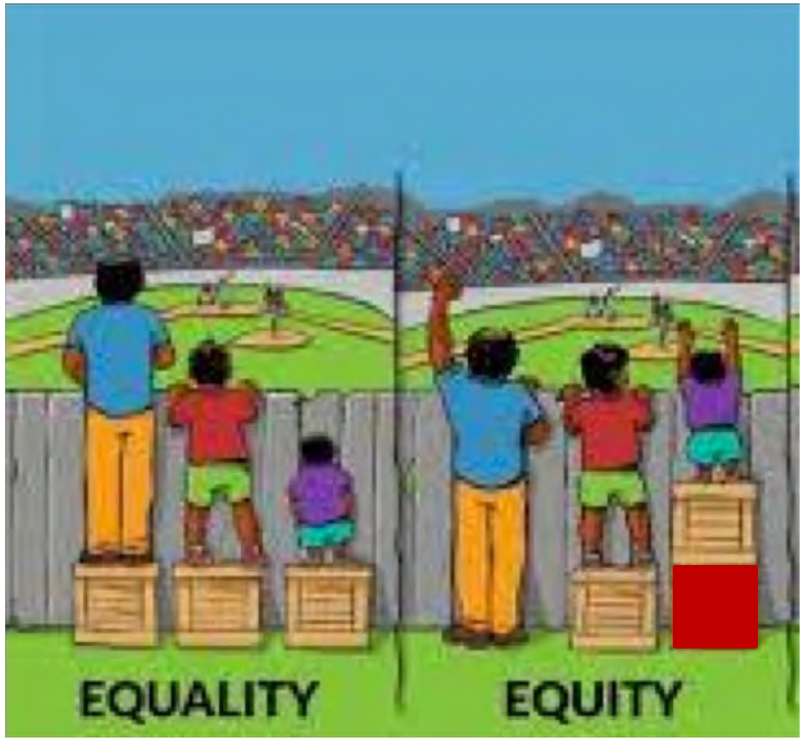
Equality vs. Equity



- Underserved communities without an established social organization need an “extra block” of help
- Extra block = time, effort, and resources to build capacity and trust

(L. Perales – from TYLO)

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Agnese Nelms Haury
ARIZONA Program in Environment and Social Justice

Thank you!

www.watersecuritynetwork.org
www.twitter.com/water_network

Acknowledgement
The International Water Security Network is funded by Lloyd's Register Foundation, a charitable foundation helping to protect life and property by supporting engineering-related education, public engagement and the application of research. For more information, see: www.lrfoundation.org.uk

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