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

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The Global Water Security Challenge

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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
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”

(Staddon et al., 2017)
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”
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
Rainwater harvesting programs in Tucson

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.

June 2018 Data from Tucson Water
Objective

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:
Engagement: STAR Academic High School

Site Location
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)
Participatory Design Process

• Collected data through a survey and interviews
• Consulted with the STAR community through the design process
Implementation of green infrastructure

• UA Green Fund gave us $25K to design, implement and evaluate GI at STAR.
Student engagement efforts

We engaged some 32 UA students in planning
  • graduate students
  • undergraduate students
  • Internships
  • volunteers

Kickoff meeting in Sept. 2018

Regular meetings with team leaders
Student engagement efforts

We engaged about 80 STAR students

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

STAR student working on mosaic
Student engagement at STAR

We engaged JTED (Joint Technological Education District) students

• used their machinery to dig basins while training STAR students
The big event: Implementation at STAR

Prep work – delivery of materials
The big event: Implementation at STAR
80 people involved in activities – planting, digging, mixing
The big event: Implementation at STAR

Before
The big event: Implementation at STAR

During
The big event: Implementation at STAR
After
The big event: Implementation at STAR

Before
The big event: Implementation at STAR

During
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
Obstacles to community engagement

- **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.

Neighborhood associations in Tucson
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)
Thank you!

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

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