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Introduction

Despite having an adequate national supply of food, there are still many in the U.S. who go to sleep hungry and suffer from health problems associated with poor nutrition. This can be attributed mainly to improper *access to healthy food*. Atlanta has the third highest density of *food deserts* out of all U.S. cities.¹ These areas are generally overlapped with higher poverty rates, higher proportion of families without access to reliable transportation, and higher rates of health problems associated with poor nutrition (obesity, heart disease, diabetes).² Our research focuses on increasing access to healthy food by developing farms in food desert areas.



FIGURE 1: Low Income Communities at least a Half-Mile from Nearest Supermarket¹

Increasing Community Engagement at Urban Sprout Farms

We see urban farms as local centers of education on health & wellbeing, nutrition, and sustainable living. For this project, we worked with Urban Sprout Farms (located in Southeast Atlanta) to help increase their community engagement. The **design prompt** was to create an area of the farm that could be used to grow a variety of produce and to increase volunteer engagement.

Design Requirements:

- Open space that can be **easily accessed** and maintained by volunteers of all ages
- Allow for **educational programs** on sustainable farming and relevant STEM lessons
- Easy and **minimal maintenance**
- Design to **conserve water**

The Proposal:

Our solution was to redevelop an overgrown section of the farm to build six **wicking beds**. These wicking beds would conserve water via bottom-up watering from a reservoir underneath them. The area around these beds, and the beds themselves, were designed to be **wheelchair accessible** so that **all** members of the community would be able to engage in the production of their locally grown produce.

Wicking Beds

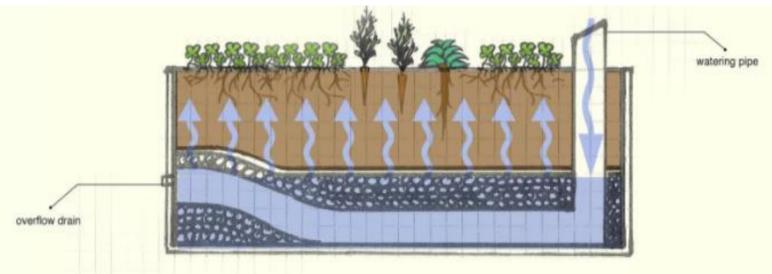


FIGURE 2: Wicking Bed Basic Design³

Why? Wicking beds were chosen for this project because they **conserve water** by watering the roots of the plant from a reservoir below, in contrast to top-watering plants where much water is lost from evaporation. In addition, wicking beds require **much less maintenance** (filling the reservoir weekly) than typical raised beds, which is crucial for the understaffed nature of many urban farms.

How They Work: Water is stored in a reservoir (lined with an impermeable membrane) below the soil. The reservoir is surrounded with a **wicking material** that allows water to travel upward, via **capillary action**, to the soil. Water diffuses from areas of higher moisture concentration (near the inlet pipe) upward to areas of lower moisture concentration (near the soil). The soil is separated from the wicking material with a permeable membrane that allows water to travel through it. From here, water can easily be taken up by the plants' root systems.

The Design

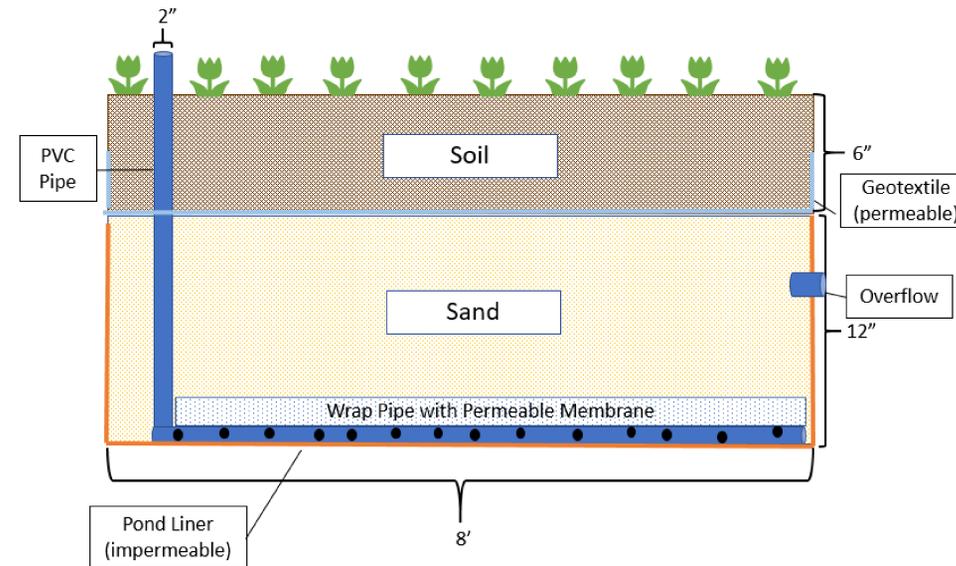


FIGURE 3: Wicking Bed Design

Design Specifications:

- **Structure:** Raised bed walls were constructed with corrugated steel panels for relative inexpensiveness and ease to work with; steel panels were attached with iron posts, chosen for structural capability, material longevity, and relative inexpensiveness (reclaimed material)
- **Length x Width:** 8' x 4' for ease of plant maintenance (still able to reach across to middle plant row from both sides) and to fit in given area on farm
- **Height:** 22" for ADA compliance; bed is raised 4" from bottom with sand; reservoir of 12" as maximum wicking distance of water via capillary action; 6" soil depth as minimum necessary for growth of target produce⁴
- **Wicking Material:** Granite sand - chosen for water-holding capability, inexpensiveness, large surface area for water adhesion compared to other rocks often used (scoria, lava rock), and larger particle size compared to other sands allowing for open spaces for water to flow upward
- **Permeable Membrane:** Geotextile or landscape fabric - between reservoir and soil to allow for water flow but prevent sand from entering soil and to prevent roots from entering reservoir
- **Soil Mix:** Includes equal parts coarse vermiculite, peat moss, and organic compost from various sources chosen based on mix's success in raised bed gardening⁴



FIGURE 4: Urban Sprouts Wicking Bed Initial Site



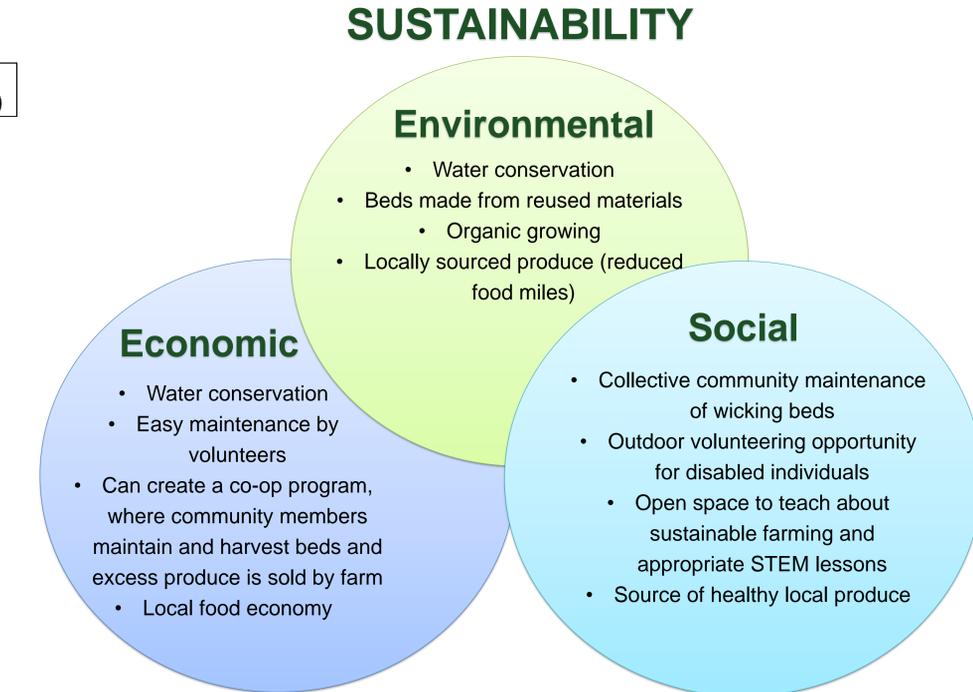
FIGURE 5: Urban Sprouts Wicking Bed Site after Clearing



FIGURE 6: Final Wicking Bed

Building Sustainable Communities through Design

Urban farms can be used as a platform to build sustainable communities by developing a local food network that brings economic, environmental, and social resiliency to an area. This wicking bed project focuses on integrating these three areas of sustainability into Urban Sprout Farms.



Conclusion & Future Work

This project demonstrates how proper farm design and planning can be used to both maximize production while also creating spaces for community engagement. In this way, urban farms can truly be the springboard for creating a resilient local food system, while also providing necessary social programs for the communities in which they reside. In the future, Urban Sprout Farms hopes to use the wicking bed area as a space for outdoor volunteer opportunities for disabled individuals, as well as an outdoor educational center about sustainable farming practices.

This project will also allow for potential university collaboration and research studies. Future research areas include investigating the effects of different wicking materials, different soil mixtures, different reservoir and soil depths, as well as the effect of possible additions such as worm bins.

References

1. R. Burns, "Stranded in Atlanta's Food Deserts", Atlanta, 2014.
2. "Metro Atlanta Food Deserts," Atlanta Journal Constitution, 2017.
3. "Wicking Beds," Green Space Vertical Gardens, 2017.
4. M. Bartholomew, "SFG: New and Improved," in All New Square Foot Gardening, Nashville, TN: Cool Springs Press, 2005.