

Utilizing urban food forests to improve nutrition

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Key Messages

- Urban food forests (UFF) can improve people's nutritional status by providing micronutrients lacking from diets.
- Many of the risks associated with UFFs are perceived risks and can be mitigated through education.
- UFFs provide a number of ecosystem benefits including flood mitigation, carbon capture, improved soil quality, increased biodiversity, and canopy cover that can regulate air temperature.
- UFF's successful implementation depends on the behavioral changes of community members incorporating foraging into their lifestyle, as well as government support through the legalization of foraging.
- The way in which a UFF is created or supported is largely dependent on the local environment.

Introduction

Green spaces in cities provide citizens with increased contact with nature, promote biodiversity, and provide a place for recreation; they can also offer an additional benefit of providing nutrients. To better utilize green spaces, which citizens already favor, Urban Food Forests (UFFs) can be incorporated. UFFs come in many forms and can be adapted to the environments they exist in. Urban Food Forests (UFFs) offer the potential to support Sustainable Development Goal 2: End Hunger, through nutritional support, and Goal 11 Sustainable Cities and Communities, through the ecosystem benefits provided by UFFs. This brief explores the meaning of UFFs, the benefits that UFFs can provide, and the risks associated with their implementation. The brief will additionally present examples of UFFs globally and recommendations to assist policy makers in implementing Urban Food Forests in the areas they govern.

Nutrition

Food deserts are low-income urban areas with few grocery stores offering fresh food, making it difficult for residents of these areas to access nutritious foods. UFFs can provide nutrient dense foods to affordably supplement the diets of those who utilize them. An example of these nutrient dense foods are dark leafy greens which have been noted to improve nutrition in East Africa.¹ The need for a more balanced diet is an issue in high-, medium-, and low-income countries alike: In the United States, for example, consuming an adequate amount of dark leafy greens is a problem. Gaining adequate nutrition is especially relevant in terms of gender inequality since the burden of preparing food in many cultures falls upon women, who are often the last member of the household to eat.²

What Are Urban Food Forests?

UFFs are multifunctional areas in cities where trees and vegetation grow with little to no human cultivation, creating habitats for wildlife. Moreover, UFFs provide green spaces for city dwellers for foraging and community gathering. UFFs are unique and vary from one geographic location to another. They are typically backed by grants, rely on volunteers, and incorporate perennial-focused land management.³ UFFs vary in how they operate concerning food allocation and harvesting policies, but they frequently center around the goal of boosting food access. UFFs are spaces which support urban foraging, the gathering of plants, and other resources in urban and peri-urban environments by socioeconomically, ethnically, and culturally diverse groups for sustenance, medicine, household materials, community cohesion, and establishing connections with nature.³ Foraging practices are common to groups of all incomes,⁴ ages, ethnic groups, and genders.⁵ Unregulated foraging can lead to depletion of resources, while managed UFFs can protect the resources from being overharvested.

Figure 1. Image of urban foragers



Source: Adapted from <https://lafoodforest.com>

UFFs are a technology meant to mimic natural environments through the utilization of permaculture to recreate the seven layers of a forest. Food forests mimic woodland ecosystems while substituting annuals and non-edible forest plants with edible trees, shrubs, and perennials.⁶ There has been a rise in the creation of food forests around various parts of the world using permaculture. Permaculture is an applied science that balances the use of high-efficiency, low-cost designs. Where there is space, UFFs can be designed in both existing and emerging cities.

Benefits

Cultural Services

- A. Micronutrients: Community members can source micronutrient-dense food from UFFs, supporting increased nutrition and preventing malnourishment.⁷
- B. Green gathering spaces: When food production decreases due to seasonality, the forest still provides valuable green space where community members can gather. City residents can benefit greatly from having green spaces in the city that can also provide nutrients.⁸
- C. Community Engagement: UFFs have the potential to bring a community together and enhance social cohesion. Community engagement can encourage unity, co-operation for communities, and community empowerment.⁹
- D. Improving mental well-being: UFFs additionally have been found to improve mental well-being.¹⁰ However, for green space to provide mental health and wellbeing benefits it's important to ensure accessibility and usability, and quality must be considered as much as quantity.¹¹

Ecosystem Services

- A. Flood Mitigation: Trees reduce stormwater runoff by capturing and storing rainfall in their

canopy and releasing water into the atmosphere. Tree roots and leaf litter also create soil conditions that promote the infiltration of rainwater into the soil.

- B. Carbon Capture: When trees and plants perform photosynthesis, they pull carbon dioxide out of the air, bind it in sugar, and release oxygen. Wood is a valuable carbon sink as it is made entirely of carbon, lasts for years as a standing tree, and takes additional years to break down after the tree dies.¹²
- C. Canopy Cover: The canopy provides shade and protects the ground from the force of rainfall and wind. It creates microclimates and windbreaks, while regulating air temperature. Thus, habitat conditions on the ground are shaped by the degree of canopy cover.¹³
- D. Biodiversity: Creating green spaces and canopy cover in urban spaces makes habitats for animals and native plants. This includes habitats for bees and other key pollinators.¹⁴
- E. Soil Quality: Trees and plants in UFFs will increase the soil's ability to absorb and retain water, produce nutrients for plants, maintain high levels of organic matter in the soil, and moderate soil temperatures.¹⁵

Additional Barriers

Community Support & Public Perception: For UFFs to be successful they need to be supported both by the government and local communities. While foraging for many communities is a part of their culture, for others it would require a behavior change. Main barriers for behavior change include lack of time, insufficient knowledge, and a perceived lack of safety. Necessary behavior changes include incorporating foraging into schedules, seasonal eating, and developing a knowledge base around foraging. The lack of foraging literacy can lead to many of the risks associated with UFFs. In order for the public to experience the benefits of UFFs, foraging knowledge is needed.

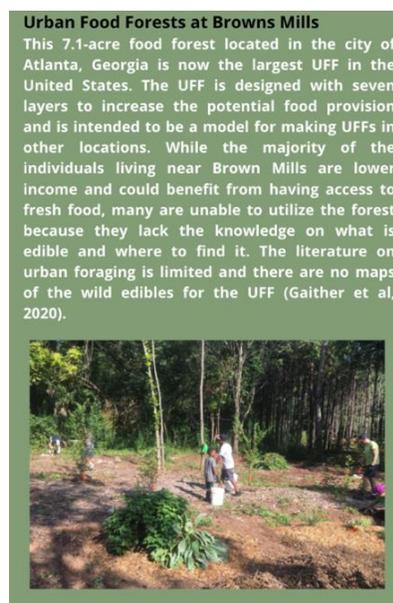
Table 1. Risks or challenges of UFFs

Risks/Challenges	Recommendations for Mitigation ¹
<p>Soil Contamination Due to proximity to high population density areas and manufacturing plants, soil may contain lead and arsenic.</p>	<p>Soil should be tested prior to planting. Contaminated areas should be marked with signs.</p>
<p>Overharvesting Prolonged mismanagement can lead to overharvesting of natural resources, thereby reducing the ability of community members in the future to utilize the forests.</p>	<p>When UFFs are managed by a city, University, or an NGO, they can monitor the depletion of plants. The managing entity can then use signs to discourage harvesting a limited plant, or it can plant more of the popular varieties.</p>
<p>Maintenance Maintenance may be required to create the forest. Maintenance may also be required if the forest is on public lands and anything happens that might be a risk to safety, such as a fallen tree.</p>	<p>UFFs can be managed through the city, a local University, or an NGO, to provide maintenance. The managing party will depend on who owns the land and the prevalence of NGOs in the area.</p>
<p>Vermin and Pests If produce is not consumed in a timely manner, it may attract vermin and pests.</p>	<p>Excess produce can be donated to local food banks to ensure it is utilized. Managing excess food can be done in conjunction with the local municipality and the food banks.</p>
<p>Misidentification of plant species While misidentification happens very rarely it is a serious potential risk as illness can occur.</p>	<p>Education regarding plant identification, sanitization needs, and consumption is necessary. Can be done through community events, signage, plant identification apps, or volunteer education.</p>
<p>Government Regulation Contradictory government practices can discourage future foragers since foraging in many settings is illegal. Lack of government support has been cited by researchers as one of the biggest barriers.</p>	<p>Governments first need to support UFFs by removing anti-foraging laws. Beyond legalizing foraging, there are opportunities for the government to allocate public lands to foraging zones.</p>
<p>Plant Limitation based on location Not all plants can succeed in every environment and some plants will not be available every season.</p>	<p>The design for new UFFs needs to be intentional. Whenever possible native plants should be used, as they are best adapted for the local environments.</p>

Urban Food Forest Types

Since UFFs are shaped by the environment, they come in different forms throughout the world. All three examples of UFFs can be improved in similar ways, so recommendations for implementation are discussed after the examples.

Figure 2. UFFs at Browns Mills



¹ Recommendations were created based on conducted interviews with experts.

Example 1- Foraging in existing forests

For regions that have pre-existing trees and forests, residents may forage in these spaces. Foraging requires patience, understanding, and a strong background in plant identification. Before foraging in existing forest, it is advised to be familiar with the rules and regulations of foraging in the city.

Example 2- Incorporating foraging into park spaces

While parks have traditionally been framed as a space for leisure and relaxation, they have the potential to be a food source as well. Some cities set aside an acre or two to be utilized as an UFF in existing parks. The food forest is managed by the same entity as the park which takes the responsibility for educating people on how to use the space. In formally designated UFFs, the organization responsible for the land might implement signage for educational purposes, identifying plants, or offering tips for new foragers.

Example 3 - Forest Creation

For urban locations without green spaces, UFFs take advantage of underutilized spaces such as vacant lots, floating barges, or overpasses. When designed using the seven layers permaculture method, UFFs include higher concentrations of nutrient-dense foods and have lower levels of maintenance than might naturally occur. Cities which use this method recognize there is a delayed payoff, since it will take the plants years to reach maturity and achieve full fruiting potential. This option additionally has significant startup costs. Support from a variety of actors is needed to locate land and source funding. Nonprofit organizations often partner with the city to provide maintenance and education while government entities aid in regulatory approval. Private entities can also be a source of acquiring land or funds to create an UFF.

Key Recommendations and Takeaways

If a municipality would like to implement an UFF then we recommend policy makers to review their climate and communities, to identify which, if any, implementation example is most applicable. A city should choose which model to use, depending on the local climate and resources. The plants incorporated in the UFFs will vary widely based on the location and local climate. Designers involved in UFFs should have thorough knowledge of the plants' productivity depending upon the local environment.

For governments that wish to support UFFs we recommend they address foraging regulation and land access issues. The first action is for the government to create policies that support foraging and remove anti-foraging legislation. Another action to be taken is the provision of land for the creation of an UFF. For management we recommend that city land management officials test the soil for contaminants, along with non-profits.

Technologies such as community maps, Quick Response (QR) codes, and plant identification applications² can be incorporated into the forests to help educate the public on foraging in a low maintenance way. In order to manage the technology there are different ownership options. If a government is leading implementation, they could maintain their own QR code system, linking to a website that updates seasonally; or a nonprofit could be partnered with to provide support.

Conclusion

UFFs can provide nutrients that are lacking from an individual's diet if they have the foraging literacy needed to recognize the uses of the plants in the UFF. Government regulations and access issues are the biggest barriers that need to be addressed. Without government support it is difficult for UFFs to be utilized and to reach their full possible impact.

² [inaturalist](#), [Seek](#), [Falling fruit](#), [Wild Edibles](#), [Berkeley Open Source Food Project](#), [Boskoi](#), [Mundraub](#)

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ANNEX 1. Expert interviews

Expert Interviews		
Name	Organization	Expertise
Marie Claire Bryant	Syracuse University, Food Studies	Researches governance and policy which impacts people's ability to grow and collect food in 13 US cities. Analyzes the data on foraging laws then places them on a spectrum from completely restricted to not mentioned at all.
Stewart Diemont	SUNY ESF, Environmental Biology	Urban restoration of locally relevant food species
Anne Bellows	Syracuse University, Food Studies	Linkages between sustainable agriculture, development and livelihoods; human rights and the right to adequate food and nutrition, including food and nutrition security; civil society, social movements, and food sovereignty; community public health; urban-rural food linkages in terms of production for trade and household consumption, migration, nutritional health, biodiversity, food safety, food practices and praxis, cultural integrity and identity, social justice, gender, and children.
Cecil Konijnendijk	The University of British Columbia	The role of trees and green space in our cities and towns. Green space governance (including community involvement), people-nature relationships and cultural ecosystem services, and urban forestry and urban greening
Mary Mattingly	Swale NYC	Explores issues of sustainability, climate change and displacement. Combines photography, performance, portable architecture and sculptural ecosystems into poetic visions of adaptation and survival.