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# HEALTH & GREEN INFRASTRUCTURE

Green infrastructure is the integration of nature and ecosystems in cities, towns, and regions to generate multiple benefits, such as clean air, better stormwater management, and public health. At the regional scale, it is a planned network of natural areas and open spaces, such as parks and nature preserves, river corridors, greenways and trails, and forests and wetlands. At the neighborhood and site scales, it includes parks, rain gardens, green streets, green walls and roofs, community gardens, and the urban forest. This fact sheet addresses how green infrastructure can improve individual and community health, information that is useful for city and regional planners, public health professionals, municipal officials, and community leaders.

Multiple social and environmental factors—in which green infrastructure can play a role—interact to determine a community's health. The three “pillars” of sustainability (economy, environment, and equity) provide a useful framework for understanding the health benefits of green infrastructure. The table below provides examples of how green infrastructure promotes health through each of these pillars, followed by additional explanations, best practices, and examples.

Economy	Environment	Equity
Green infrastructure investments provide jobs and enable green communities that promote physical activity, resulting in reduced healthcare costs.	Street trees and other components of the urban forest provide health benefits for urban populations by improving air and water quality, reducing heat island effects, and supporting walkable communities.	Green infrastructure can address the conditions that lead to disparities in health outcomes for poor and marginalized communities (environmental justice).

**Parks, trails, and other green infrastructure can do more than support economic growth, environmental sustainability, and social equity. An increasing amount of research examines the connection between access to nature and mental health—many studies find a correlation between increased exposure to green areas and improved mental health. As planners pursue the practices identified in this fact sheet, it is worth noting that green infrastructure provides both physical and mental health benefits.**

## Economy

An economy that provides opportunities for all residents is essential to a healthy community. Green infrastructure investments such as parks, greenway trails, and street trees support jobs, retail activity, and economic development; reduce energy, healthcare, and gray infrastructure costs; and strengthen the tax base for reinvestments in education and community development.

**Best Practice:** *Cost-Benefit Analysis.* Incorporate health benefits and costs into analyses of infrastructure projects. Consider green infrastructure approaches with proven health benefits as alternatives to traditional gray infrastructure.

**Example:** *Green City, Clean Waters, Philadelphia.* The Philadelphia Water Department conducted a triple-bottom-line analysis of the city's Long-Term Control Plan Update. This analysis found that solving the city's combined sewer overflow problem through green rather than gray infrastructure would yield a more than 2:1 return on investment on approximately \$1 billion spent over 40 years, taking into account health-related factors such as more green jobs, additional recreational user-days, and fewer heat-related deaths.

## Environment

Green infrastructure integrates natural resources, ecosystem services, and the benefits they provide into the built environment. It improves environmental conditions such as air and water quality that impact human health; improves mental health by increasing connections with nature; and ameliorates temperature extremes and the urban heat island effect.

**Best Practice:** *Urban Forest Management Plan.* Develop a plan, establish a tree canopy coverage target, and devote adequate resources to maintaining and enhancing the urban forest and its public health benefits.

**Urban Forestry Tool:** *i-Tree* is a software suite available from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools. It enables a municipality to assess its tree canopy and the benefits it provides, such as air pollution removal, associated public health incidence reduction and economic benefits, and reduced energy usage. Numerous communities have used i-Tree to develop assessments and recommendations for improving their urban forests.

## Equity

Scientific studies demonstrate that poor and minority communities have significantly worse health outcomes than their more affluent neighbors. Moreover, they typically do not have the same level of access to green infrastructure resources such as parks, trees, and garden areas. Green infrastructure investments can reduce disparities in green access and provide multiple health benefits, such as better air quality, lower temperatures during heat waves, improved community safety, and access to healthy foods.

**Best Practice:** *Urban Agriculture.* Provide residents of underserved communities with access to healthy foods through urban farms and community gardens.

**Example:** *Baltimore City, Maryland* is a leader in using urban agriculture to increase access to fresh, healthy food. The city-wide food systems plan, sustainability plan, community garden and farm incentive programs, and public policy decisions work in concert to ensure underserved areas have equitable access to fresh, healthy food.

## Putting It All Together

Green infrastructure can improve public health while advancing the triple bottom line of sustainability. Municipalities can use green infrastructure approaches to leverage multiple benefits for residents, thus making a compelling case for the investment of limited public resources.

**Best Practice:** *Community-wide Green Infrastructure Plan.* Develop a vision, plan, and implementation program for establishing a green infrastructure network in your community, either as a stand-alone document or as an element of a comprehensive or general plan. Address the public health benefits of green infrastructure in developing the plan, for example, by conducting a Health Impact Assessment (HIA).

**Example:** *The Mid-South Regional Greenprint* is a 25-year plan to create 500 miles of greenway trails and 200 miles of bicycle paths across the Memphis metropolitan region (four counties covering Tennessee, Arkansas, and Mississippi). An HIA of the plan revealed that implementing the Greenprint plan will impact health through the building of healthy communities, using parks and trails as existing resources for health, and promoting healthy travel behaviors.

## RESOURCES:

American Rivers. Growing Green: How Green Infrastructure Can Improve Community Livability and Public Health. June 2012. <https://www.americanrivers.org/assets/pdfs/green-infrastructure-docs/growing-green-how-green-infrastructure-can-improve-community-livability.pdf>

Rouse, David C. and Ignacio F. Bunster-Ossa. Green Infrastructure: A Landscape Approach. American Planning Association: Planning Advisory Service Report Number 571, 2013.

Schwab, James, ed. Planning the Urban Forest: Ecology, Economy, and Community Development. American Planning Association: Planning Advisory Service Report Number 555, 2009.

Trust for Public Land, The Health Benefits of Parks: <https://www.tpl.org/health-benefits-parks>

University of Washington Urban Forestry/Urban Greening Research, Green Cities Good Health: [www.greenhealth.washington.edu](http://www.greenhealth.washington.edu)

U.S. Environmental Protection Agency Green Infrastructure Resources: <http://water.epa.gov/infrastructure/greeninfrastructure/>

U.S. Forest Service i-Tree Tools for Assessing and Managing Community Forests: <https://www.itreetools.org/>