Health Benefits of Urban Trees
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Few things can compare with the visual impact and seasonal interest that trees bring to an urban environment. Trees and green spaces foster community cohesion by creating a sense of place, a local identity, and a system of landmarks. Treed areas can provide space for leisure and community activities, helping residents to take pride in the attractiveness of their neighborhood.

Trees can also have surprising effects on the physical and psychological wellbeing of local populations. Ongoing scientific research has continued to provide overwhelming evidence of the numerous benefits and advantages that trees can bring to the urban environment, in terms of both their social and environmental impact. In fact, the establishment of healthy urban tree populations is quickly becoming a central component in strategies set out by urban planners and local authorities.
In addition to the health benefits outlined in this ebook, trees and urban green spaces foster community cohesion by creating a sense of place, a local identity, and a system of landmarks. Treed areas can provide space for leisure and community activities, helping residents take pride in the attractiveness of local neighborhoods.
One area of international concern in which trees are already playing a vital role to control is the creation of carbon offsets and the regulation of greenhouse gas emissions. Trees are proven to absorb carbon and their ability to do so is one of their most valuable properties in light of global efforts to reduce climate change. A single tree can absorb as much as 48 lbs of carbon dioxide per year and can sequester 1 ton of carbon dioxide by the time it reaches 40 years old (North Carolina State University). Although our tree populations currently absorb approximately 2% of total emissions, this could potentially be a lot more.

Planting trees remains one of the most cost-effective means of drawing excess CO2 from the atmosphere, with research showing that over a 50-year lifespan, a tree generates almost $32,000 worth of oxygen and provides $62,000 worth of air pollution control (Urban Forestry Network).
As one of their most important impacts, trees are capable of improving air quality by removing and storing a surprising amount of harmful pollutants such as:

- Sulphur Dioxide
- Nitrogen Oxides & Particulates
- Carbon Monoxide
- Cadmium
- Nickel
- Lead

Plus, a single mature tree can release enough oxygen back into the atmosphere to support 2 human beings (Mike McAliney, 1993).
Due to the removal of harmful chemicals from our local ecosystems, trees decrease smog formation and have been shown to help reduce incidences of skin cancer, asthma, and stress-related hypertension illnesses (Tree Design Action Group).

A study by Andrea Faber Taylor and Frances Kuo from the University of Illinois suggests that trees and other greenspace can have a therapeutic effect on children suffering from Attention Deficit & Hyperactivity Disorder (ADHD), improving both their attention levels and social functioning. The same research also showed that students with regular access to trees and greenspace performed better in tests.
“A single tree can absorb as much as 48 lbs of carbon dioxide per year and can sequester 1 ton of carbon dioxide by the time it reaches 40 years old”

North Carolina State University
Improving Air Quality

A past study performed in the Netherlands indicates that every 10% increase in greenspace can postpone health complaints in communities by five years, while a separate US study suggests that hospital patients with a view of nature through hospital windows recover better after surgery. This type of data has prompted health authorities around the world to increase tree plantings on hospital properties.
“Having an average of 10 more trees in a city block improves health perception in ways comparable to an increase in annual personal income of $10,000 or being seven years younger.”

Joint Research Project on the Health Benefits of Street Trees
Improving Cardio-Metabolic Health

While many studies over the years have revealed that exposure to greenspace can improve mental health, reduce blood pressure and stress levels, and increase physical activity; few studies have quantified the impacts that individual trees have on human health.

New joint research piloted by the Institute for Clinical Evaluative Sciences, the University of Chicago, and the Rotman Research Institute (amongst others), was conducted in Toronto, Ontario and published in July, 2015. The study probed into the health benefits affiliated with urban street trees based on the assumption that trees are the most consistent green components in urban areas. The study focused on greenspace consisting of tree canopy only and not of bushes, grassland, or other “natural” settings. The research also went as far as to distinguish between trees along roads and streets versus those in private yards, parks, and other open areas; in hopes that such a distinction would be helpful for future urban planning policies.
Improving Cardio-Metabolic Health

The researchers hypothesized that street trees could have stronger beneficial associations with an individual’s health than park trees and other greenspace because they are usually more accessible to all residents in a given neighborhood or suburb location, as people are exposed to street trees in their daily activities and through views from windows when indoors.

Released earlier this year, the study results suggest that people who live in neighborhoods with a higher density of trees on their streets report significantly higher health perception and considerably less cardio-metabolic conditions, even when controlling for socio-economic and demographic factors such as age and income. This analysis shows that having an average of 10 more trees in a city block improves health perception in ways comparable to an increase in annual personal income of $10,000 and moving to a neighborhood with $10,000 higher median income, or being seven years younger.
Results from multiple regressions and multivariate canonical correlation analyses indicate that people who live in areas that have more (and/or larger) trees on the streets have significantly fewer cardio-metabolic conditions, having recorded decreases of 0.04 units of cardio-metabolic conditions for every increase of 408 cm² / m² in tree density.

The study continues to annotate that 10 more trees in every block is about a 4% increase in street tree density in a dissemination area in Toronto. With most Toronto areas having between a 0.2% to 20.5% range of street tree density, this increase seems to be logistically feasible. According to the research findings, the resulting improvement in health perception and decrease of cardio-metabolic conditions by planting 10 more trees per city block is equivalent to increasing the income of every household in that city block by more than $10,000 - which far outweighs the cost of planting the additional 10 trees.
The Toronto joint research project went on to explain that additional street tree plantings to reach the defined canopy density can be incorporated into various areas along roads in both residential suburban areas and downtown streets. The difficulty with street tree planting of course, is the fundamental conflict between maximizing uncompacted soil volume for root growth while still providing the structural integrity required for roads and sidewalks.

Tree growth and fertility are strongly influenced by soil structure, as it affects the movement of air, water, and nutrients required for trees to flourish. Structural soil that has been compacted for load-bearing stability is resistant to root penetration and significantly reduces root growth. This stunts the maturity of a tree and in many cases leads to death of the tree.
Successful Urban Tree Planting

A well-constructed soil functions like a reservoir, enabling a tree to accept, store and transmit water, nutrients, and energy; while providing room for roots to propagate. Good uncompacted soil allows the space required for life and the necessary biochemical exchanges for growth.

There is a way however to maintain the structural integrity of paved surfaces without compromising the soil requirements that urban trees need to thrive. Structural support modules (or soil cells) are modular units that assemble to form a skeletal matrix situated below paved surfaces. They support pavement loads, including vehicular traffic, while providing a large volume of uncompacted soil within the matrix for healthy tree root growth.
About GreenBlue Urban

Founded in 1992, GreenBlue was established to conduct research into urban tree planting practices and provide solutions to assist trees in their battle to thrive in urban areas. With the goal of drastically improving urban planting success and increasing leaf canopy in cities, GreenBlue tirelessly analyzed the challenges, the causes of failure, and the reasons for premature mortality in urban trees. We then examined the negative impact that poor planting can have on urban infrastructures. Having identified the key issues in both of these areas, we systematically researched the solutions for those issues and designed practical products and systems to address them.

Local authorities, landscape architects, engineers and other related professionals increasingly turn to GreenBlue for guidance and best practice advice in tree planting implementation. As the global market leader and specialist in urban landscape products, GreenBlue and our overseas partners are able to offer the results of nearly twenty years of frontline experience, exhaustive research, product development and field trials. Our program of continuous product development ensures that specifiers and clients can rest assured that the systems we offer for urban planting schemes represent the best available. For further information, please visit our website or contact our knowledgeable team of consultants.

Establishing the future urban landscape

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