

The Benefits of Plants and Landscaping

Compiled by Marc S. Frank, April 2003

- According to the National Gardening Association, 85 million (79 percent of) U.S. households participated in some form of gardening activity in the year 2002. American consumers spent a total of \$39.6 billion on their lawns and gardens in 2002. That was an increase of \$1.9 billion or 5% over 2001. Over the past 5 years, total lawn and garden sales have increased at a compound annual growth rate of 8%.
Source: <http://www.nationalgardening.com/RSRCH/feature.asp>

Economic Benefits

- Landscaping can add as much as 14% to the resale value of a building and speed its sale by as much as 6 weeks.
Source: "Economic Benefits of Landscape", Associated Landscape Contractors of America. <http://commerce.infosrc.com/docdelivery/alca/Uploads/Econben.doc>
- A Clemson University study documented the impact of landscaping on resale value of single family residences. A house that obtained an excellent landscape rating from a local landscaping professional could expect a sale price 4 to 5 percent higher than equivalent houses with good landscaping. Homes with landscaping ranked poor relative to neighboring homes with excellent landscapes could expect a sale price 8 to 10 percent below equivalent homes with good landscape appeal.
Source: Henry, Mark S. 1994. "The contribution of Landscaping to the Price of Single Family Houses: A Study of Home Sales in Greenville, South Carolina". *Journal of Environmental Horticulture* 12(2): 65-70.
- By spending 5% of the value of your home on the installation of a quality low-maintenance landscape, you could boost the resale value by 15%, earning back 150% or more of your landscape investment.
Source: Taylor, C. 2003. "Fertile Ground". *Smart Money*, March 2003.
<http://www.smartmoney.com/mag/index.cfm?story=march03-cover>
- A survey in Quebec found that hedges raised property values by 3.6%, a landscaped curb by 4.4%, and a landscaped patio by 12.4%.
Source: Taylor, C. 2003. "Fertile Ground". *Smart Money*, March 2003.
<http://www.smartmoney.com/mag/index.cfm?story=march03-cover>
- A study by Joel Goldsteen of the School of Urban and Public Affairs at the University of Texas, Arlington, showed that, of all the architectural and urban design variables evaluated, landscape amenities had the highest correlation with the occupancy of rental properties
Source: "Economic Benefits of Landscape", online fact sheet, Associated Landscape Contractors of America.
<http://commerce.infosrc.com/docdelivery/alca/Uploads/Econben.doc>
- Properly selected and placed plants can lower home heating and cooling costs by as much as 20%.
Source: "Economic Benefits of Landscape", Associated Landscape Contractors of America. <http://commerce.infosrc.com/docdelivery/alca/Uploads/Econben.doc>

- Proper arrangement of landscape plants around buildings can substantially reduce both heat loss and cold air infiltration through walls and floors during the winter months. Source: DeWalle, D.R. 1978. "Manipulating Urban Vegetation for Residential Energy Conservation." *Proceedings of the National Urban Forestry Conference*, ESF Pub. 80-003, pp. 267-283.
- Carefully positioned trees can reduce household energy consumption for heating and cooling by up to 25%. Computer models from the U.S. Department of Energy estimate that three properly placed trees can save an average household between \$100 and \$250 in heating and cooling energy costs annually. Source: U.S. Department of Energy, 1995. <http://www.eere.energy.gov/erec/factsheets/landscape.html>
- A tree shading an outdoor air conditioner unit can increase its efficiency by as much as ten percent. Source: U.S. Department of Energy, 1995. <http://www.eere.energy.gov/erec/factsheets/landscape.html>
- According to the U.S. Department of Energy, if your home is not already shaded you can reduce your air conditioning costs by 15% or more by adding a well-planned landscape. This is accomplished by using trees and bushes to block the sun from windows and walls; reducing air temperatures outside the home with properly placed shade trees; and planting groundcovers, trees, and shrubs to reduce the heat reflected from the ground to walls and windows. Shrubs and vines planted next to the house provide year-round insulation by creating an air space. Source: Arizona Public Service Company, 1999. <http://www.aps.com/images/pdf/landscaping.pdf>
- In a survey of one southern community, 74% of the public preferred to patronize commercial establishments that had structures and parking lots planted with trees and other landscaping. Source: Center for Urban Horticulture, University of Washington College of Forest Resources, 1998. "Urban Forest Values: Economic Benefits of Trees in Cities". Human Dimensions of the Urban Forest Fact Sheet No. 3. <http://www.cfr.washington.edu/research.envmind/HumanBens/EconBens-FS3.pdf>
- A survey of consumers in eight U.S. cities showed that retail shopping districts with an orderly and well-maintained planting scheme, including both trees and accessory vegetation, received the highest visual quality ratings. Source: Center for Urban Horticulture, University of Washington College of Forest Resources, 1998. "Trees in Business Districts: Comparing Values of Consumers and Business". Human Dimensions of the Urban Forest Fact Sheet No. 4. <http://www.cfr.washington.edu/research.envmind/CityBiz/BizPrefs-FS4.pdf>
- A mail survey of licensed drivers in Washington state found that the presence of trees and green space appears to positively influence both consumers' attitudes about the character of a place and the prices that shoppers are willing to pay in local businesses. Source: Center for Urban Horticulture, University of Washington College of Forest Resources, 2000. "Community Image: Roadside Settings and Public Perceptions". Human Dimensions of the Urban Forest Fact Sheet No. 10. <http://www.cfr.washington.edu/research.envmind/Roadside/Rsd-Community-FS10.pdf>

- An interview-based survey of business owners and business association staff indicates that trees and landscaping in neighborhood commercial districts 1) create a pleasant space that attracts people; 2) act as an outdoor extension of the business' customer service commitment; and 3) can help to develop a distinctive identity for and define the boundaries of a business district, thereby encouraging return visits.
Source: Center for Urban Horticulture, University of Washington College of Forest Resources, 1998. "Growing with Green: Business Districts and the Urban Forest". Human Dimensions of the Urban Forest Fact Sheet No. 2.
<http://www.cfr.washington.edu/research.envmind/CityBiz/BizQual-FS2.pdf>
- The organization Partners for Livable Places maintains that plants are the fastest, most cost-effective agents for changing negative perceptions of an area, enhancing the economic and social conditions and improving the psychosocial health.
Source: Relf, D. 1992. "Human Issues in Horticulture". *HortTechnology* 2(2):
<http://www.hort.vt.edu/human/hihart.htm>

Health and Psycho-social Benefits

- You can burn as many calories in 45 minutes of gardening as in 30 minutes of aerobics. One hour of weeding burns 300 calories (the same as walking or bicycling at a moderate pace), and manual push mowing of the lawn burns 500 calories per hour (the same rate as playing tennis).
Source: Taylor, M.K. 1990. "The Healthy Gardener". *Flower & Garden* March/April:46-47.
- In one study, women 50 and older who gardened at least once a week had higher bone density than those who jogged, walked, swam or did aerobics.
Source: "Gardening: It's Good For You!", National Gardening Association
<http://www.nationalgardenmonth.org/health.htm>
- A recent study at the Sloan Kettering Institute in New York found that women recover from breast cancer surgery quicker if they spend time in a garden, according to a report by the American Horticultural Therapy Association.
Source: http://aggie-horticulture.tamu.edu/galveston/featured_master_gardener.htm
- Workers with a view of natural elements, such as trees and flowers, experienced less job pressure, were more satisfied with their jobs and reported fewer ailments and headaches than those who either had no outside view or could only see built elements from their windows.
Source: Kaplan, S., J.F. Talbot, and R. Kaplan. 1988. "Coping With Daily Hassles: The Impact of Nearby Nature on the Work Environment". Project Report. USDA Forest Service, North Central Forest Experiment Station, Urban Forestry Unit Cooperative Agreement 23-85-08.
- A Washington State University study shows that live interior plants may increase worker productivity and reduce stress. Productivity increased twelve percent when people performed a simple task on a computer in a windowless room with plants compared to workers who performed the same task in the same room without plants.
Source: Lohr, V.L., C.H. Pearson-Mims, and G.K. Goodwin. 1996. "Interior Plants May Improve Worker Productivity and Reduce Stress in a Windowless Environment". *Journal of Environmental Horticulture* 14(2): 97-100.

- In one study of college students under stress from an exam, views of plants increased positive feelings and reduced fear and anger.
Source: Ulrich, R.S. 1979. "Visual landscapes and psychological well-being". *Landscape Research* 4(1): 17-23.
- In a survey of residents at nine multi-family housing sites, the most important factors in neighborhood satisfaction were the availability of trees, well landscaped grounds and places for taking walks.
Source: Kaplan, R. 1985. "Nature at the Doorstep: Residential Satisfaction and the Nearby Environment". *Journal of Architectural Planning Research* 2:115-127.
- Among residents of retirement communities, pleasant, landscaped grounds were important (48.5%) or essential (50.5%) to 99% of the residents. A window view of green, landscaped grounds was three times as important as a view of activity areas. The configuration and natural elements of the grounds were given as the most important reasons for selecting the particular retirement community.
Source: Browne, C.A. 1992. "The Role of Nature for the Promotion of Well-Being of the Elderly". In: D. Relf (ed.). *The Role of Horticulture in Human Well-Being and Social Development: A National Symposium*. Timber Press, Portland, Oregon.
- A 1982 Gallup Poll revealed over 3 million Americans garden at community sites, an additional 7 million would garden if land were available, and 76 percent of those polled would like gardens to be a permanent part of their communities.
Source: Patel, I.C. 1992. "Socioeconomic Impact of Community Gardening in an Urban Setting". In: D. Relf (ed.). *The Role of Horticulture in Human Well-Being and Social Development: A National Symposium*. Timber Press, Portland, Oregon.
- Community gardening leads to community development and greater community spirit, empowering neighbors to produce food and strengthen neighborhoods. Economic opportunities are also created – fresh vegetables and fruits improve nutrition in family diets and reduce food bills. Neighborhood appearances are improved and real estate value rises.
Source: Patel, I.C. 1992. "Socioeconomic Impact of Community Gardening in an Urban Setting". In: D. Relf (ed.). *The Role of Horticulture in Human Well-Being and Social Development: A National Symposium*. Timber Press, Portland, Oregon.
- Residents who participated in a tree-planting program in their low-income neighborhood in Oakland, California, reported feeling a stronger sense of community, enhanced communication with neighbors, and more control over their environment.
Source: Ames, R.G. 1980. "The Sociology of Urban Tree Planting". *Journal of Arboriculture* 6(5): 120-123.
- In an analysis of the relationship between crime rates and vegetation at inner city public housing developments in Chicago, buildings with high levels of greenery had roughly half as many crimes as buildings with no greenery.
Source: Kuo, F.C., and W.C. Sullivan. 2001. "Environment and Crime in the Inner City: Does Vegetation Reduce Crime?". *Environment and Behavior* 33(3): 343-367.
<http://www.herl.uiuc.edu/canopy.htm>
- A study of inner city children by University of Illinois researchers Andrea Faber Taylor, Frances E. Kuo and William C. Sullivan revealed that girls with a home view of trees and other greenery scored higher on tests of self-discipline. A self-disciplined girl will better

handle peer pressure, sexual pressure and challenging situations. She will make more thoughtful choices and will do better in school.

Source: Taylor, A.F., F.E. Kuo, and W.C. Sullivan. 2001. "View of Nature and Self-Discipline: Evidence from Inner City Children". *Journal of Environmental Psychology* 22(1-2): 49-63. <http://www.herl.uiuc.edu/girls.htm>

- A study by University of Illinois researchers suggests that playtime in outdoor green spaces can have a positive impact on children with Attention Deficit Disorder (ADD). Compared to the aftereffects of play in paved outdoor or indoor areas, activities in natural, green settings were far more likely to leave ADD children better able to focus, concentrate and pay attention. The 'greener' a child's play area, the less severe his or her attention deficit symptoms.
Source: Taylor, A.F., F.E. Kuo, and W.C. Sullivan. 2001. "Coping With ADD: The Surprising Connection to Green Play Settings". *Environment and Behavior* 33(1): 54-77. <http://www.herl.uiuc.edu/kids.html>
- "A recent scientific study by the University of Illinois at Urbana-Champaign found that the more trees and grass in the common spaces of inner-city neighborhoods, the more those spaces are used by residents. And, use of these spaces means more opportunities for informal social interaction. In other words, relationships between neighbors are made stronger simply through the presence of vegetation."
Source: Kuo, F.E., W.C. Sullivan, R.L. Coley, and L. Brunson. 1998. "Fertile Ground for Community: Inner-City Neighborhood Common Spaces". *American Journal of Community Psychology* 26(6): 823-851. <http://www.herl.uiuc.edu/Neighbors.htm>
- A study by the University of Illinois Human-Environment Research Laboratory has demonstrated that green views and access to green spaces in urban areas help restore attention and relieve the everyday pressures of living in poverty. Green spaces also contribute to a healthier environment and foster a sense of community, making them particularly valuable in inner-city neighborhoods."
Source: Kuo, F.E. 2001. "Coping With Poverty: Impacts of Environment and Attention in the Inner City". *Environment and Behavior* 33(1): 5-34. <http://www.herl.uiuc.edu/plants.htm>
- "A scientific study by the Human-Environment Research Lab has demonstrated that contact with nature may actually help reduce the incidence of aggression and violence in inner-city neighborhoods. According to this study, levels of aggression were significantly lower among people who had some kind of nature outside of their apartments versus those who didn't."
Source: Kuo, F.E., and W.C. Sullivan. 2001. "Aggression and Violence in the Inner City: Effects of Environment via Mental Fatigue". *Environment and Behavior* 33(4): 543-571. <http://www.herl.uiuc.edu/vegetations.htm>

Environmental Benefits

- Trees, shrubs, turf, and groundcovers trap and filter dust and other pollutants out of rainwater. Plants benefit from the nutrients in this particulate matter and prevent it from becoming a source of water pollution.
Source: Washington State Nursery and Landscape Association
<http://www.wsnl.org/retail/news/benefits.html>

- Planting landscape buffers can reduce the flow of sediments and pollutants into nearby bodies of water. As surface water runoff moves through the vegetation buffer, sediments and pollutants are filtered out. In general, the wider the plant buffer the greater the pollutant removing capacity.
Sources: Florida Department of State, 2000.
<http://www.dep.state.fl.us/law/Grants/CMP/pdfs/stormwatermems.pdf>
University of Rhode Island Cooperative Extension
http://www.uri.edu/ce/wq/has/html/has_landpublic.html
- Landscaping with woody plants along streambanks and shorelines can reduce soil erosion, filter pollutants, and reduce downstream flooding.
Source: Cornell Cooperative Extension of Onondaga County
<http://www.cce.cornell.edu/onondaga/fingerlakeslan/default.htm>
- Plants improve air quality. "One tree can remove 26 pounds of carbon dioxide from the atmosphere annually, equaling 11,000 miles of car emissions. Landscape plants, including shrubs and turf, remove smoke, dust, and other pollutants from the air. One study showed that 1 acre of trees has the ability to remove 13 tons of particles and gases annually."
Source: "Enhancing Our Environment Through Landscaping", Virginia Cooperative Extension, 1996. http://www.ext.vt.edu/departments/envirohort/articles/lawns_and_landscaping/enhanenv.html
- An average tree absorbs 26 pounds of carbon dioxide from the air each year and releases enough oxygen each day to supply a family of four.
Source: Source: Washington State Nursery and Landscape Association
<http://www.wsnla.org/retail/news/benefits.html>
- In urban microclimates plants are useful in moderating the temperature effects of solar and infrared radiation, thus increasing comfort levels.
Source: Herrington, L.P. 1980. "Plants and People in Urban Settings". *Proceedings of the Longwood Program Seminars* 12:40-45. Longwood Gardens, Kennett Square, Pennsylvania.
- Research by the National Aeronautics and Space Administration (NASA) has proven that plants help to remove organic volatile compounds from indoor air. "Low levels of chemicals such as carbon monoxide and formaldehyde can be removed from indoor environments by plant leaves alone, while higher concentrations of numerous toxic chemicals can be removed by filtering indoor air through the plant roots surrounded by activated carbon. The carbon absorbs large quantities of toxic chemicals and retains them until the plant roots and associated microorganisms degrade and assimilate these chemicals."
Source: <http://www.greenworks.com/healthbenefits.htm>
- An Iowa State University research project is evaluating how landscaping can help to control odors from livestock operations, in addition to providing visual isolation and aesthetic enhancement.
Source: Iowa State University, 1998
<http://www.extension.iastate.edu/Publications/PM1754H.pdf>
- "Properly selected and placed plantings absorb sound waves, and can significantly reduce unwanted 'noise pollution'. Additionally, in the presence of breeze, some plants make pleasant sounds of their own. Further, the wildlife attracted to a planted habitat

sometimes results in pleasant natural sounds. These sounds of nature mask and further diminish unnatural noise pollution.”

Source: Washington State Nursery and Landscape Association
<http://www.wsnl.org/retail/news/benefits.html>

The Benefits of Plants and Landscaping Addendum

Marc S. Frank, 15 April 2003

Environmental Benefits

- An urban ecosystem analysis of greater San Antonio (Texas) conducted by the organization American Forests has calculated that the area's tree cover is saving the city \$70 million a year in ecological services, including storm water management, air quality, and energy conservation.
Source: "Trees Save San Antonio Millions Each Year". *Florida Arborist* 6(1): 1, 6 (Spring 2003).
- Trees absorb the carbon dioxide that contributes to global warming, as well as other gases that contribute to urban pollution. Trees combat global warming by absorbing the carbon emitted by vehicles, lowering carbon emissions from fossil fuel-burning plants, and reducing the energy used for climate control in buildings.
Source: Wagner, Joan. 2003. "Urban Forestry: Making a Global Difference". *International Society of Arboriculture Arborist News* 12(2): 26-28 (April 2003).