

#PlantsDoThat

Horticulture: The Art, Science, & Business of Plants

Horticulture contributes \$196 billion to the US economy across a diverse array of businesses. But the story doesn't end there. Horticulture benefits the wealth and health of every citizen and every community in the US.

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**National Initiative for
Consumer Horticulture**

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Where We LIVE

A 25-foot tree reduces annual heating and cooling costs for typical homes by 8-12%.

Our homes represent 25% of our personal wealth. Well-landscaped homes are more valuable.

Improvements to your landscape pays off! The return on investment for landscape upgrades is 109%.

1/4 of American homes grow berries, veggies, or fruit trees.



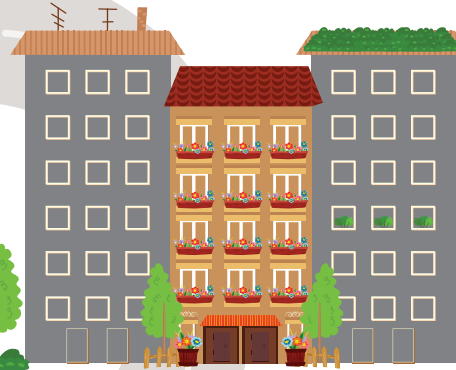
Horticulture creates 2 million jobs across a diverse array of businesses.

Where We WORK

Green roofs provide beauty and moderate rooftop temperatures, reducing heat loads and lowering energy costs.

Office plants reduce employee sick time by 14% and improve work productivity and speed.

Upkeep and preservation of urban green habitats creates new jobs, boosts local economies, and adds to community prosperity.



Where We SHOP

Stores with landscaped areas have expanded sales resulting from longer shopping occasions and can charge more due to higher perceived quality.



Where We PLAY

America's public gardens are key tourist destinations and contribute \$2.3 billion in community tourism spending.

Parks provide cities and citizens significant value. In Philadelphia, parks generate \$23 million in city revenue, \$16 million in municipal cost savings, and \$1.1 billion in cost savings for citizens.



There are 4 million miles of US roadways. Street trees preserve paved surfaces. Shaded roads save up to 60% of repaving costs. Trees also improve driver safety and result in fewer traffic accidents.

Trails and greenways increase property values and make adjacent homes sell faster.



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Authors

Hall C, Thilmany D, Mellard S, Gray J, Hamrick D, Altman K, Behe B, Bumgarner N, Calabro J, Carson J, Gouge D, Miller M, Parker P and McBride P (2017). #PlantsDoThat Horticulture: The Science, Art & Business of Plants, National Initiative for Consumer Horticulture. Available from <http://consumerhort.org/>.

References

Appleseed, I. (2009, May 2009). "Valuing central park's contributions to New York City's economy." from <http://www.appleseedinc.com/reports/centralpark-may2009.pdf>.

Bradshaw, J. and L. Tozer (1993) Enviroscaping to Conserve Energy: a Guide to Microclimate Modification.

Balogun, A. A., et al. (2014). "Effect of tree-shading on energy demand of two similar buildings." Energy and Buildings 81: 305-315.

Berry, R., et al. (2013). "Tree canopy shade impacts on solar irradiance received by building walls and their surface temperature." Building and Environment 69: 91-100.

Bringslimark, T., et al. (2007). "Psychological Benefits of Indoor Plants in Workplaces: Putting Experimental Results into Context." HortScience 42(3): 581-587.

Butterfield, Bruce (2016). "National Gardening Survey 2016 edition." Garden Research.com.

Clements, J., et al. (2013). "The Green Edge: How Commercial Property Investment in Green Infrastructure Creates Value." Natural Resources Defense Council.

Coma, J., et al. (2016). "Thermal assessment of extensive green roofs as passive tool for energy savings in buildings." Renewable Energy 85: 1106-1115.

Crompton, J. L., et al. (2004). "The proximate principle: the impact of parks, open space and water features on residential property values and the property tax base." Ashburn, Va., National Recreation and Park Association.

Damigos, D. and F. Anyfantis (2011). "The value of view through the eyes of real estate experts: A Fuzzy Delphi Approach." Landscape and Urban Planning 101(2): 171-178.

Des Rosiers, F., et al. (2002). "Landscaping and House Values: An Empirical Investigation." Journal of Real Estate Research 23(1/2): 139-161.

Dravigne, A., et al. (2008). "The Effect of Live

Plants and Window Views of Green Spaces on Employee Perceptions of Job Satisfaction." HortScience 43(1): 183-187.

Escobedo, F. J., et al. (2015). "Urban forest structure effects on property value." Ecosystem Services 12: 209-217.

Farmer, M. C., et al. (2013). "Bird diversity indicates ecological value in urban home prices." Urban Ecosystems 16(1): 131-144.

Freybott, J., et al. (2016). "Understanding the contribution of curb appeal to retail real estate values." Journal of Property Research 33(2): 147-161.

Gibbons, S., et al. (2014). "The Amenity Value of English Nature: A Hedonic Price Approach." Environmental and Resource Economics 57(2): 175-196.

Gray, T. (2017). Re-Thinking Human-Plant Relationships by Theorising Using Concepts of Biophilia and Animism in Workplaces. Reimagining Sustainability in Precarious Times, Springer: 199-215.

Hall, C. and Dickson, M. (2011). Economic, Environmental, and Health/Well-Being Benefits Associated with Green Industry Products and Services: A Review, J. Environ. Hort. 29(2):96-103.

Hodges, Alan W., et al. "Economic Contributions of the Green Industry in the United States in 2013." HortTechnology 25.6 (2015): 805-814.

Hui, E. C. M., et al. (2012). "The impact of landscape views and storey levels on property prices." Landscape and Urban Planning 105(1-2): 86-93.

Kadish, J. and N. R. Netusil (2012). "Valuing vegetation in an urban watershed." Landscape and Urban Planning 104(1): 59-65.

Ko, Y., et al. (2015). "Long-term monitoring of Sacramento Shade program trees: Tree survival, growth and energy-saving performance." Landscape and Urban Planning 143: 183-191.

Kovacs, K. F. (2012). "Integrating property value and local recreation models to value ecosystem services from regional parks." Landscape and Urban Planning 108(2-4): 79-90.

Laverne, R. J. and K. Winson-Geideman (2003). "The influence of trees and landscaping on rental rates at office buildings." Journal of Arboriculture 29(5): 281-290.

Lerner, A. and M. Stopka (2016). "The Financial Benefits of Biophilic Design in the Workplace."

Lipetzky, T., et al. (2016) "An Overview of Public Attitudes of the Role of Food and Agriculture on Colorado's Economy, Environment and Overall Health." http://foodsystems.colostate.edu/wp-content/uploads/2017/02/Public-Attitudes-Gov-Forum_Tom-Dawn-Martha.pdf

Liu, S. and D. Hite (2013). "Measuring the Effect of Green Space on Property Value: An Application of the Hedonic Spatial Quantile Regression." Southern Agricultural Economics Association, 2013 Annual Meeting, Orlando, Florida.

Lundholm, J., et al. (2010). "Plant Species and Functional Group Combinations Affect Green Roof Ecosystem Functions." PLoS ONE 5(3).

McCord, J., et al. (2014). "Effect of public green space on residential property values in Belfast metropolitan area." Journal of Financial Management of Property and Construction 19(2): 117-137.

McPherson, E. G. and J. Muchnick (2005). "Effects of Street Tree Shade on Asphalt Concrete Pavement Performance." Journal of Arboriculture 31(6): 303-310.

McPherson, E. G., et al. (2011). "Million trees Los Angeles canopy cover and benefit assessment." Landscape and Urban Planning 99(1): 40-50.

McPherson, E. G. and J. R. Simpson (2002). "A comparison of municipal forest benefits and costs in Modesto and Santa Monica, California, USA." Urban Forestry & Urban Greening 1(2): 61-74.

McPherson, E. G. (1992). "Accounting for Benefits and Costs of Urban Greenspace." Landscape and Urban Planning 22(1): 41-51.

McPherson, E. G., et al. (1989). "Effects of 3 Landscape Treatments on Residential Energy and Water-Use in Tucson, Arizona." Energy and Buildings 13(2): 127-138.

McPherson, E. G., et al. (1988). "Impacts of Vegetation on Residential Heating and Cooling." Energy and Buildings 12(1): 41-51.

McPherson, E. G. (1988). "Functions of Buffer Plantings in Urban Environments." Agriculture Ecosystems & Environment 22-3: 281-298.

McPherson, E. G., et al. (2016). "Structure, function and value of street trees in California, USA." Urban Forestry & Urban Greening 17: 104-115.

Melichar, J. and K. Kaprova (2013). "Revealing preferences of Prague's homebuyers toward greenery amenities: The empirical evidence of distance-size effect." Landscape and Urban Planning 109(1): 56-66.

Mullaney, J., et al. (2015). "A review of benefits and challenges in growing street trees in paved urban environments." Landscape and Urban Planning 134: 157-166.

Nappi-Choulet, I. and S. Labussière (2015). "Greening up our cities: Bringing new value to new spaces in the Paris region." Corporate Real Estate Journal 5(1): 57-68.

Netusil, N. R., et al. (2014). "Valuing green infrastructure in Portland, Oregon." Landscape and Urban Planning 124: 14-21.

Nieuwenhuis, M., et al. (2014). "The Relative Benefits of Green Versus Lean Office Space: Three Field Experiments." Journal of Experimental Psychology. Applied 20(3): 199-214.

Niu, H., et al. (2010). "Scaling of Economic Benefits from Green Roof Implementation in Washington, DC." Environmental Science & Technology 44(11): 4302-4308.

Pandit, R., et al. (2014). "Valuing public and private urban tree canopy cover." Australian Journal of Agricultural and Resource Economics 58(3): 453-470.

Pandit, R., et al. (2013). "The effect of street trees on property value in Perth, Western Australia." Landscape and Urban Planning 110: 134-142.

Panduro, T. E. and K. L. Veie (2013). "Classification and valuation of urban green spaces—A hedonic house price valuation." Landscape and Urban Planning 120: 119-128.

Park, J., et al. (2017). "The influence of small green space type and structure at the street level on urban heat island mitigation." Urban Forestry & Urban Greening 21: 203-212.

Payton, S., et al. (2008). "Valuing the benefits of the urban forest: a spatial hedonic approach." Journal of Environmental Planning and Management 51(6): 717-736.

Pearson-Mims, C. H. and V. I. Lohr (2000). "Reported Impacts of Interior Landscaping in Office Environments in the United States." HortTechnology 10(1): 82-86.

Pérez, G., et al. (2014). "Vertical Greenery Systems (VGS) for energy saving in buildings: A review." Renewable and Sustainable Energy Reviews 39: 139-165.

Perini, K. and P. Rosasco (2013). "Cost-benefit analysis for green façades and living wall systems." Building and Environment 70: 110-121.

Sander, H. A. and C. Zhao (2015). "Urban green and blue: Who values what and where?" Land Use Policy 42: 194-209.

Saphores, J.-D. and W. Li (2012). "Estimating the value of urban green areas: A hedonic pricing analysis of the single family housing market in Los Angeles, CA." Landscape and Urban Planning 104(3-4): 373-387.

Sawka, M., et al. (2013). "Growing summer energy conservation through residential tree planting." Landscape and Urban Planning 113: 1-9.

Shoemaker, C. A., et al. (1992). "Relationships between Plants, Behavior, and Attitudes in an Office Environment." HortTechnology 2(2): 205-206.

Simpson, J. R. and E. G. McPherson (1998). "Simulation of tree shade impacts on residential energy use for space conditioning in Sacramento." Atmospheric Environment 32(1): 69-74.

Shukur, F. et al. (2016) "The Values of Parks to the House Residents." Procedia- Social and Behavioral Sciences 9 (2012): 350-359.

Thomsen, J. D., et al. (2011). "People-plant Relationships in an Office Workplace: Perceived Benefits for the Workplace and Employees." HortScience 46(5): 744-752.

Trust for Public Land and the Philadelphia Parks Alliance (2008). How Much Value Does the City of Philadelphia Receive from its Park and Recreation System? <http://cloud.tpl.org/pubs/>

ccpe_PhilParkValueReport.pdf

Tyrvaainen, L. and A. Miettinen (2000). "Property prices and urban forest amenities." Journal of Environmental Economics and Management 39(2): 205-223.

Wang, Z.-H., et al. (2016). "Cooling and energy saving potentials of shade trees and urban lawns in a desert city." Applied Energy 161: 437-444.

Wolf, K. L. (2014). "City trees and consumer response in retail business districts." Handbook of Research on Retailer-Consumer Relationship Development (Musso F., Druica E., eds). Hershey, PA: IGI Global: 152-172.

Wolf, K. L. (2008). "Community Context and Strip Mall Retail Public Response to the Roadside Landscape." Transportation Research Record (2060): 95-103.

Wolf, K. L. (2005). "Trees in the small city retail business district: Comparing resident and visitor perceptions." Journal of Forestry 103(8): 390-395.

Wolf, K. L. (2004). "Nature in the Retail Environment: Comparing Consumer and Business Response to Urban Forest Conditions." Landscape Jnl. 23(1): 40-51.

Wolf, K. L. (2004). "Trees and business district preferences: a case study of Athens, Georgia, U.S." Journal of Arboriculture 30(6): 336-346.

Zhang, B., et al. (2014). "The cooling effect of urban green spaces as a contribution to energy-saving and emission-reduction: A case study in Beijing, China." Building and Environment 76: 37-43.

Credits

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