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What Are the Economic Costs and Benefits of Home Vegetable Gardens?

Abstract

Home vegetable gardens are often promoted as a way to cut household costs by providing low-cost access to fruits and vegetables. How much can gardeners expect to spend and recoup from their efforts? An analysis of published data suggests that home vegetable gardens are profitable, if the fair market value of garden labor is excluded from calculated costs. On average, home vegetable gardens produce \$677 worth of fruits and vegetables, beyond the cost of \$238 worth of materials and supplies. Local environmental conditions, gardening practices, and crop choices will influence the actual net value realized by individual gardeners.

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Introduction and Need

Vegetable gardens allow families to produce their own food organically. This is a huge benefit for consumers who recognize the benefits of organic foods, but are wary of paying an added cost at the grocery market (Raab & Grobe, 2005). Vegetable gardens may be particularly advantageous for low-income groups, who don't identify fresh fruits or vegetables as a staple food (Parker, Pinto, Kennedy, Phelps, & Herman, 2007), perhaps because of perceived costs.

Extension professionals have noted resurgent interest in vegetable gardens (Miller & Arnold, 2012), perhaps due to the recent economic recession. In fact, "recession gardens" is the new term for "victory gardens" (Higgins, 2009; Horovitz, 2009). Extension professionals are commonly asked about the costs and benefits of home vegetable gardens. Even though very little data exists on the economic costs versus benefits, Extension home horticulture professionals often recommend vegetable gardens as a way to access fresh, healthy foods at a relatively low cost. However, while I was working on a SNAP-Ed-funded curriculum ("Growing Healthy Kids," 2013), my Extension colleagues who work with low-income individuals, families, and groups regularly questioned the economic costs and benefits of home vegetable gardens. They asked for more data before we recommend that gardens can be used to supplement the family food budget.

One estimate of the economic value of vegetable gardening found that the average vegetable gardener in Newark, NJ could expect to net \$475 worth of produce, with only a \$25 investment in their garden (Patel, 1991). However, the costs incurred and the produce harvested from New Jersey gardens were estimated, rather than rigorously tracked.

Solid data on the economic costs and benefits associated with vegetable gardening is needed in order for Extension professionals to confidently promote gardening as a way to supplement the family food budget. I thus searched for references that rigorously detailed the economic costs and benefits of home vegetable gardens.

Methods

I searched the Google and Google Scholar databases, as well as the *Journal of Extension*, *HortScience*, and *HortTechnology* archives for various combinations of the keywords: home, community, garden, economic, value, cost, yield. I only included those reports that rigorously detailed the economic costs and yield from each garden. Non-peer-reviewed sources were included only if they reported an exhaustive and detailed list of the economic costs and yield from a home garden. I found a total of four journal articles and two blogs, which reported 10 observations of the economic costs and yields for 11 vegetable gardens.

- Utzinger and Connolly (1978) reported the average costs and benefits across four replicate 150 square foot gardens in Columbus, OH. Hours of labor were tracked. Costs incurred included equipment, seeds, plant starts, pesticides, soil test, land rental, fertilizer, mulch, and water.
- Stall (1979) reported on a 600 square foot demonstration garden in Homestead, FL. Hours of labor were not tracked. Costs incurred included soil, blocks, hardware, water, stakes, mulch, fertilizer, seeds, and pesticides.
- Stephens, Carter, and Van Gundy (1980) reported on a 1400 square foot garden in Tallahassee, FL. and a 638 square foot garden in Jacksonville, FL. Hours of labor were tracked. Costs incurred included equipment, seeds, plant starts, fertilizer, pesticides, water, and stakes.
- Cleveland, Orum, and Ferguson (1985) reported on two vegetable gardens (829 and 624 square feet) in Tucson, AZ. Hours of labor were tracked. Costs incurred included seeds, plant starts, soil amendments, fertilizers, mulch, tools, water, and the cost of hauling compost.
- Doiron (2009) reported on a 1500 square foot vegetable garden in Scarborough, ME. Hours of labor were not tracked. Costs incurred included seeds, supplies, water, soil test, and compost.
- Roth (2011) reported on a single 878 square foot vegetable garden in Portland, OR, where costs and harvests were tracked across 3 years (2008, 2009, and 2011). Hours of labor were tracked. Costs incurred included seeds, plant starts, pesticides, fertilizers, potting soil, hoses, compost, mulch, and soil amendments.

Four out of the above six sources are 25 or more years old. Although these references may seem

dated, the information that they contain is extremely valuable for my analysis. The gardening tools, supplies, and methods reported in these papers are still used today, although the costs associated with starting and maintain a garden were substantially less than they are today. To correct for this disparity, I adjusted all economic costs and values to current prices (i.e., 2013 value) using an online Consumer Price Index inflation calculator (Bureau of Labor Statistics, n.d.). This allowed data to be compared across studies.

Yields were reported as pounds per crop harvested. Authors estimated the dollar value of garden yields, based upon the cost per pound for each crop at a local grocery store. In addition, authors tracked and reported material and supply costs. Although equipment depreciation or land rental costs were included in the costs of maintaining a garden in some studies (Stephens et al., 1980; Utzinger & Connolly, 1978), these costs were excluded from this analysis.

Most authors also reported the number of hours worked in the garden and the fair market labor costs associated with these hours. If no labor rate was quoted, I calculated labor costs using the Federal- or state-mandated minimum wage rate for the year the study was published.

I then calculated the difference between yield and cost to estimate the net value of each garden. The net value of each garden was calculated with and without labor costs. A net value per square foot of garden was also calculated with and without labor costs.

Results

Overall, gardens were profitable if the fair market value of labor used to tend the garden was excluding from the costs (Table 1). Excluding labor costs, gardens yielded an average \$678 ± \$515 worth of fruits and vegetables, over and above the costs of irrigating the garden, as well as the costs of buying seeds, starts, soil and other materials. When scaled to garden size, the average yield per square foot of garden space was \$0.88 ± \$0.64. However, when labor costs were included in the cost-benefit analysis, the net value of home vegetable gardens declined to an average of -\$81 ± \$499 per garden, or -\$0.11 ± \$0.67 per square foot of garden space. Although the yield and net value across gardens varied quite a bit (note the large standard deviations), costs of materials and supplies were relatively consistent across gardens, at \$237 ± \$85.

Table 1.
Summary of Economic Costs and Benefits of Home Vegetable Gardens

Source	Cost			*Value of Yield	Net Value			
	*Materials and Supplies	Hours of Labor	*Fair Market Cost of Labor		*Net Value (including Labor Costs)	*Net Value (excluding Labor Costs)	Net Value / square foot (including Labor Costs)	Net Value / square foot (excluding Labor Costs)
Utzinger	\$115	39	\$149	\$322	\$58	\$208	\$0.39	\$1.39

& Connolly, 1978								
Stall, 1979	\$306	NR	NR	\$1585	NA	\$1279	NA	\$2.13
Stephens et al., 1980	\$162	23	\$201	\$1082	\$720	\$921	\$0.51	\$0.66
Stephens et al., 1980	\$200	68	\$594	\$1172	\$379	\$973	\$0.59	\$1.53
Cleveland et al., 1985	\$187	153	\$1104	\$333	-\$959	\$145	-\$1.16	\$0.17
Cleveland et al., 1985	\$217	111	\$800	\$385	-\$633	\$167	-\$1.01	\$0.27
Doiron, 2009	\$305	NR	NR	\$2072	NA	\$1767	NA	\$1.18
Roth, 2011	\$343	54	\$463	\$651	-\$155	\$308	-\$0.18	\$0.35
Roth, 2011	\$380	72	\$650	\$876	-\$154	\$496	-\$0.18	\$0.56
Roth, 2011	\$158	48	\$421	\$678	\$99	\$520	\$0.11	\$0.59
Mean	\$237	71	\$548	\$916	-\$81	\$678	-\$0.11	\$0.88
Standard Deviation	\$85	40	\$293	\$546	\$499	\$515	\$0.67	\$0.64
Median	\$209	61	\$528	\$777	-\$48	\$508	-\$0.11	\$0.66

*All costs and values reflect dollar values in 2013.

In each garden, tomatoes ranked among the top five most profitable garden crops. Leafy green vegetables made the top five most profitable crops in all but one garden (Roth, 2011, for the garden grown in 2008). Other profitable crops that appeared in the top five lists of multiple gardens included peas, strawberries, squash, and eggplant.

Conclusion

Extension professionals can confidently recommend vegetable gardening as a way to save money on fresh fruit and vegetable purchases. Although the fair market cost of labor can add a substantial cost, most people do not hire help to tend their vegetable garden. In addition, the benefits of gardening extend well beyond the potential financial benefits. For example, vegetable gardening promotes healthy eating (Alaimo, Packnett, Miles, & Kruger, 2009; Langellotto & Gupta, 2012), stress relief (Rodiek, 2002), and physical activity (Park, 2007). Gardening has also been linked to a decreased risk of dementia (Simons, Simons, McCallum, & Friedlander, 2006) and may be more effective at treating childhood obesity than other therapeutic interventions (Braet, Van Winckel, & Van Leeuwen, 2008).

Although I attempted to standardize costs and yields by excluding equipment depreciation estimates from reported costs, and reporting all costs and yields in terms of 2013 dollar values, there was still a fair amount of variation in the net value of home gardens (note the large standard deviations). This is likely because each garden reflects the local conditions, gardening practices, crop choices, and skill of each gardener. For example, see the following.

- Stephens et al. (1980) note that the larger, Tallahassee garden (1,400 square feet) yielded less than the smaller, Jacksonville (638 square feet) garden, due to less efficient use of space (i.e., wider row spacing).
- Roth (2011) noted that better weather and acquired skills led to better yields in 2009, compared to 2008.
- Cleveland et al., (1985) report irrigation costs for their two desert gardens that are far greater than irrigation costs in the other gardens included in this analysis.
- Doiron (2009) had the most profitable yield of all of the gardens. He is also the founder of Kitchen Gardeners International (<http://kgi.org/>) and is widely recognized as an expert vegetable gardener.
- The three Florida (Stall, 1979; Stephens et al., 1980) gardens yielded the next highest harvest value (\$1585, \$1082, and \$1172), after Doiron (2009). This perhaps reflects the longer growing season and more favorable climatic conditions for productive vegetable gardening.

It is thus not fair to promise home gardeners that they can net \$678 worth of fruits and vegetables if they start a home garden. It is not fair to suggest that one square foot of a home vegetable garden is worth \$0.88. The standard deviations associated with these averages are just too large. Nonetheless, this analysis demonstrates that vegetable gardening can help a family save money on their food budget, particularly if household members (rather than hired help) maintain the garden. In addition, the relatively small standard deviation associated with start-up materials and supplies (\pm \$85) suggests that it is fair to tell prospective home gardeners that they can expect to spend a couple hundred dollars to start and maintain a home vegetable garden.

It is important to point out that these studies noted the value of fruits and vegetables that were harvested from home gardens, rather than the value of produce that was actually used in meals and

in snacks. It is not uncommon for home gardeners to grow more food than they can use at the time of harvest. However, the same could be said for perishable food items purchased at a grocery market. Food waste in the United States has increased by more than 50% since 1974 (Hall, Guo, Dore, & Chow 2009).

Nonetheless, the potential to learn more about food preservation or using garden-grown produce in home-cooked meals represents an opportunity to build stronger collaborations between Extension Master Gardeners and Extension Family and Community Health professionals. Master Food Preservers and SNAP-Ed educators are experts at low cost food preparation and preservation. Working together, we could maximize the family food budget by encouraging home vegetable gardening and the use of garden-grown produce in family snacks and meals.

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