The potential of home gardening as a mode of environmental education:
Connections to environmental problem solving

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Précis

Identifying and implementing effective, sustainable methods of providing adequate provisions to a growing world population is of pressing global concern. Management strategies for agri-food and natural resource systems require adaptive techniques and interdisciplinary participation. Environmental education has the potential to increase environmental understanding to consumers, and therefore boost interest in developing and using proactive methods of ensuring global environmental sustainability. Through the examination of one form of informal environmental education, the potential for participatory environmental education efforts may become more fully appreciated and understood.

Home gardening is unique among alternative food production methods in that the consumer also serves as a productive role. This research will analyze traits, opinions, and motivations of home gardeners in Washington State in order to examine whether home gardening can change personal levels of awareness, instigating environmentally based improvements to consumption habits. The research is based upon data generated from consumer phone survey of 1027 Washington state residents. This work focuses on comparing the food purchasing habits and mindset of individuals with home gardens versus those without. Based upon the idea that home gardening serves as a participatory, informal mode of environmental education, variation between gardeners and non-gardeners on food purchasing habits and environmental mindsets was expected.

Initially, it was determined that the propensity to garden did not vary based upon classic demographic traits, although motivations for that gardening may still vary amongst different demographics. Gardeners did vary from non-gardeners for two of sixteen classical factors to
explain food purchasing; the importance of whether food is easy to prepare and the value of local food production. Washington gardeners are less likely to be concerned about easy food preparation and more likely to be concerned about local food production than non-gardeners. Additionally, various benefits of home gardening were reported by gardeners, suggesting that gardening may be capable of creating connections between food production and cultural, recreational, and economic benefits for a community.

Additional research on the motivations and characteristics of home gardeners would aid in developing the role of home gardening as a method of improving environmental understanding and appreciation amongst citizens. Further analysis of gardeners to determine the role of demographics in developing motivation to garden would be beneficial, as well as research based upon how opinions and actions may change in individuals from before and after participating in home gardening. Interview based survey methods to include personal insight may be helpful for this suggestion. This research has suggested potential for home gardening to improve an individual’s respect for food production, and therefore it deserves further consideration in improving environmental education to include participatory based methodology.
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Introduction

Reports of environmental degradation, loss of natural habitat, and differential human access to natural resources have become commonplace in our globalizing world. Whether in the news media, academic studies, or political discussions, it is increasingly common in the United States and elsewhere to hear about environmental problems the human race needs to tackle immediately. Clearly, continuation of the resource management status quo is seemingly catastrophic, but finding the most effective alternatives to tackle feeding and supporting a growing population in the current situation is not going to be simple. Certainly, policy options aimed at addressing these problems have been and will continue to be highly debated. One sensible way to approach solving this problem, as with many other human challenges, might involve locating and correcting the source of the issue, and then initiating proactive rather than reactive solutions. With respect to current environmental issues facing humanity, I will argue that developing such preventive solutions will only be successful if we target peoples’ lack of recognition of the demands that human existence has placed upon our environment. Many citizens in so-called “developed” societies live in a context where the natural resource base of their everyday lives is hidden from their views and their existence. It is this disconnect about where resources come from and what the impacts of using those resources are that represents the source of the environmental problématique (Bührs 2009).

I was raised in a place where environmental concerns have clashed with societal norms. As much of the rural area of Lewis County, Washington was developed in the days of a thriving timber industry, local populations are especially concerned with protection of this lifestyle. This has defined the culture for the last century. Jobs available in my hometown have essentially revolved around timber harvest in the forests or lumber processing at the mills. Over the last
several decades, the region has struggled with a declining timber industry due to a convoluted thread of circumstances. These circumstances include the reduced availability of timber because of decades of intense harvests, which led to the changing of harvest practices in efforts to sustain forests (Freudenberg et al. 1998). Research of timber dependent communities of the nearby Olympic Peninsula has shown that industrial restructuring led to a decline in employment rates. Changes included technological advancement and increased hiring of poorly paid workers, often minorities. To the local community, a combination of protection for the spotted owl and decreased timber availability was an easy explanation for community decline, even if the Endangered Species Act was not fully to blame. Timber communities saw the federal government side with the owls and were outraged by the devastation witnessed in their communities and quickly framed this issue as a trade-off of owl preservation for local jobs (Kirschner 2010).

Growing up in this atmosphere formed the basis for my interest in understanding the complexity of environmental issues. Regardless of what was to blame for local social and economic decline, both the local communities and the organizations which supported owl preservation failed at understanding the impact that their preferred actions would have on the people involved and the natural environment. It was easier for the timber industry to blame the ESA than face the realization that the structure of the industry was unsustainable. The federal government and environmental organizations on the other side supported reactionary problem solving efforts to protect local forests without lessening the market desire for timber. This had the effect of exporting the extraction issue to other locations. My experiences relating to this example framed the concept for this research project. My interest stems from the idea that
increased understanding of resource use amongst individuals is necessary to develop proactive, long term solutions for environmentally based problems or conflicts.

The ability of informational “eco-labels” to alter markets demonstrates that increased consumer understanding of how a resource is provided can affect a market. For example, the introduction of the dolphin-safe tuna label drastically altered consumer behavior. Society became willing “to pay to avoid personally contributing to dolphin mortality as a result of tuna fishing.” Support for the dolphin-saving cause increased to such a level that dolphin-safe cans become the standard throughout the U.S. (Teisl et al., 2001). Awareness about the damage of dolphin by-catch during tuna fishing was enough to change consumer behavior. However without the relatively small community of individuals who initiated the push for labeling, the majority of American consumers would not have known about the issue or been inspired to research the intricacies of tuna fishing on their own. In this example, increased consumer awareness was successful at reducing the number of dolphins killed during tuna harvest. This leads me to question how this type of awareness could be replicated for other environment or resource based issues.

It is well-established that Americans value their ability to pursue specific ambitions in life while letting the provision of basic goods be someone else’s problem (Orr 1994). It is a common inclination in American culture to value the availability of a garbage service to haul away our weekly waste with no worry about what becomes of it, or to appreciate the convenience of home plumbing and the variety of food available down long grocery aisles. How often do we consider the consequences of use of water and food resources, waste control, and sanitation? Rarely. The popular aphorism, “you never know the worth of water until the well runs dry” implies that this consideration does not occur until we encounter a problem with
supply. This suggests a predisposition towards reactionary problem solving. Targeting the inclination to ignore the demand our very existence places upon the natural environment could lead to development of environmental solutions that recognize the interconnectedness of our daily actions with global environmental issues.

Even after accepting the need for increased understanding of the real impacts of consumption on natural resource utilization, addressing how to fulfill this knowledge gap remains complex. In his book entitled *Earth in Mind: On Education, Environment, and the Human Prospect*, David Orr suggests the necessity of educational reform to incorporate ecological understanding as a priority for every student. Orr argues that “the demands of building good communities within a sustainable society in a just world order will require more than the specialized, one-dimensional mind and more than instrumental cleverness.” He highlights the problem of encouraging academic specialization amongst scholars, and stresses the importance of interdisciplinary studies to encourage understanding of the connection between all subjects and the reliance of the human race on what our environment provides. Environmental education, Orr argues, will hone appreciation for the environment, and thus pave the way for solutions to develop (Orr 1994).

The idea of environmental integration has grown in recent years, although it was not sufficiently well conceptualized until thoroughly discussed by Ton Bührs in *Environmental Integration: Our Common Challenge*. The idea of environmental integration is the incorporation of “environmental considerations into everyday human thinking, behavior, and practices.” Bührs argues that this integration is imperative for tackling our environmental challenges, and feels that simple environmental education will be insufficient as a solution because it can negatively imply equal responsibility amongst all individuals and divert attention from the structural, economic,
and political causes of environmental problems. Bührs argues that environmental education is currently unsuccessful, and that successful environmental integration should bring about “coherence and consistency between actions and behavior affecting the environment,” (2009).

Bührs and Orr can appear to contradict each other with their differing analyses of the effectiveness of environmental education. This contradiction has to do with the degree of environmental education each is discussing. Bührs is analyzing the success of currently used forms of environmental education, which he defines as cognitive and external environmental integration, while Orr is suggesting the need for expansion of environmental education to go beyond current forms. In that sense, Orr agrees with Bührs that current environmental education is currently lacking. With increased and broadened environmental education as Orr is proposing, the public’s level of awareness could impact political and economic discussion on a broad scale. Therefore, Orr’s improved environmental education would serve a more useful role in environmental integration.

In this paper, I hope to investigate the possibility for effective environmental education by focusing on the practice of home gardening, which shall be considered an example of a practice that expands and strengthens environmental understanding through informal education. My analysis will examine if the ideas of Orr and Bührs may actually be supportive of one another through assessment of the practice of home gardening amongst Washington State consumers. If home gardening can expand the gardener’s insight into the issues of food provision, it would support Orr’s hypothesis that environmental education can build appreciation for the environment that leads to solutions to pressing environmental issues. It will suggest that an activity that forces interaction between society and the fulfillment of resource needs may bridge gaps in understanding the demands of human existence. Therefore, the scope of
environmental education would be expanding beyond cognitive and external integration to fit a more useful role in Bührs’ integration strategies. The presence of informed and concerned consumers created by environmental education would lead to changes in political and economic decisions of those consumers.

**Literature Review**

Home gardening, which I broadly define as families utilizing their own labor and resources to produce products for self use and consumption, is an important form of food provisioning with a long history (Marsh 1998). Home gardening has recently become a method of alternative agriculture, meaning a mode of food acquisition that is not incorporated within the so-called conventional agri-food system that now dominates American society. The conventional dominant food system was defined by Knorr and Watkins as a “capital intensive, large-scale, highly mechanized agriculture with monocultures of crops and extensive use of artificial fertilizers, herbicides, and pesticides, with extensive animal husbandry” (as quoted in Beus and Dunlap, 1990). This system has led to the wide assortment, availability, low price and abundance of foods now available in supermarkets and restaurants across America, but concerns with this system also exist. Critics argue that hidden costs outweigh benefits including the effects of soil erosion and degradation, chemical pollution to groundwater and food, and the societal and economic impacts of increased industrialized food production. These latter impacts include decreased food access, homogenization of available food, and a decrease in family wage jobs through mechanization and a poorly paid unskilled workforce (Beus and Dunlap 1990; Schlosser 2001). Industrialization of food production has been associated with significantly decreased farm numbers, clustering production into specialized “agricultural pockets” and virtually eliminating the connection between local production and consumption (Lyson 2004). It
is fair to observe that the conventional agri-food system has allowed consumers to acquire food without a personal connection to food production. Increased consumer knowledge about some of the negative effects of conventional agriculture might be detrimental to the conventional industry. A lack of consumer awareness about production has taken place, in part as a result of food marketing strategies, and the majority of the population simply does not think sufficiently about negative social or environment impacts when purchasing food. Conventional agriculture contributes to a disconnect between people and their natural resource base and encourages ignorance or avoidance of the fact that natural resources sustain our existence and are thus worthy of protection.

Understanding of and reaction towards the various problematic effects of conventional agriculture has grown and led to a growth in the number of, and popularity in, various types of “alternatives.” These so-called alternatives are difficult to characterize by any specific set of traits because they are not organized or controlled by any sort of governing body. Instead, they are organized by an array of movements by various groups, organizations, and activists. Although, as *Worlds of Food* suggests (Morgan et al 2006), considered collectively, these Alternative Agrifood Movements (AAMs) constitute a “social movement” of sorts. The term “alternative agriculture” has come to signify the “use of environmentally-friendly farming practices in general, and the benefits of farm diversification (Gold 2007, Alternative Farming Systems Information Center).” Home gardens can be considered a form of alternative agriculture because they offer a food choice produced in a way that corresponds with the themes of the alternative movement by offering food options not dependent upon industrialized, large-scale production, but instead dependent on localized and literally home-grown foods. More importantly for this research project, gardening, which is a means of self-provisioning, may also
offer opportunities for people to become more aware of the natural resource base of their own existence because, unlike most other alternative forms, gardening requires direct human-nature contact.

Recent literature suggests that home gardening can contribute to a variety of positive outcomes. A large portion of this literature focuses on the role of home gardening in poor rural areas, often in undeveloped countries. In her article title “Building on traditional gardening to improve household food security,” Robin Marsh argues that increased access to nutritional foods is the most crucial benefit of home gardening in undeveloped areas. With specific examples from Bangladesh, Marsh reviewed a broad range of literature on home gardening systems to emphasize important factors in promoting sustainable home gardening. Several considerations which she claims to be crucial to successful home gardening systems can be applied to establishing gardening in all types of communities. According to Marsh, understanding local climatic, cultural, and economic constraints and incorporating nutritional education are important components of developing gardening plans that will adequately provide enough goods to justify their costs (Marsh 1998). These aspects suggest that gardening contributes to an understanding of local spatial limitations and how policy and education affect food production.

Food access and security is not currently as widespread of an issue for the United States and other developed countries as it is for developing countries; however research on other impacts of home gardening is readily available for these areas. As dementia becomes a rising concern in Australia, incorporating gardens into nursing homes has been studied as a way to improve the quality of life for elderly residents with dementia. In their article titled “Multisensory Environments for Leisure,” Cox et al. indicates that residents observed in a garden area tended to show increased animation and pleasure as compared to when observed in a
standard living room environment. Their study concludes by suggesting that gardening environments could improve well-being for nursing home residents with dementia and suggest that more nursing homes should utilize gardens for increased patient health and happiness (Cox et al. 2004).

In a study entitled “Domesticated Nature: Motivations for gardening and perceptions of environmental impact,” Susan Clayton analyzes the results of a survey of 126 garden center visitors in the United States on their attitudes towards gardening. This survey was concerned with all types of gardening, including lawn uptake, so it did not specifically assess the benefits of gardening for food or other goods. However Clayton reports that the gardeners were motivated by self-reported benefits of gardening, such as increased social interaction, reduced stress, and nature connectedness (Clayton 2007). Wellbeing and personal health benefits that arise from gardening expand the benefits of self production beyond a simple improved method of food acquisition to broaden the scope of educational benefits achieved from gardening.

While gardening has been included in discussions as part of AAMs, comparatively little research has assessed whether these alternatives in general, and gardening in particular, might have a positive environmental educational benefit for those who participate in the strategy. As conventional agriculture made access to abundant food simple and cheap, consumers no longer needed to be intimately connected to the food production process. A simple trip to one supermarket provides food from around the world, from produce to pasteurized dairy products to pre-made meals. Acquiring food no longer requires skill or knowledge in the process of its production, and in particular how natural conditions, such as soil quality, water availability, or climate, affect the ability to produce food. Choosing to acquire food produced through alternative methods requires individuals to invest more energy into understanding the process of
Without this understanding, conventional agriculture can be more appealing to consumers because these foods are affordable, accessible, and socially acceptable. With home gardening, individuals are intimately connected to producing their own food, representing a hands-on education that attempts to integrate environmentalism with the everyday necessity of food acquisition. If home gardening can strengthen the AAM, while improving ecological sustainability and empowering individuals with the knowledge to limit their impacts, it could strengthen Orr’s argument on the ability of environmental education to lead to greater societal change. Additionally, with this level of success, home gardening may expand its capability of environmental integration in making the environment a high priority in everyday decision making.

Marsden argues that development of sustainable and productive agri-food systems “will have to be ‘place-based’” as an “embedded, connected and localized activity (2011).” He states agriculture must be appreciated “as an interdependent and integrated component in complex human, cultural and ecological systems (2011).” Morgan et al. suggest that in gaining a better understanding of food production, the outcomes of differing production systems in varied spaces and places must be considered, as well as the role of nature and the activities of political institutions (2006). These suggestions produce an opportunity for home gardening to have significant impact in the push for increased alternative agriculture practices. If home gardening can help individuals gain such an understanding, I would argue that it can have impacts that span beyond increased health, recreational, or community benefits of home food production. As home gardens expose individuals to the limitations of local food production and the ability of natural forces to impact crop and resource success, this knowledge could increase awareness of agricultural production as a natural resource activity. More informed citizen consumers are
likely to act differently in the marketplace and political arenas, moving the level of environmental education to have greater success as a tool for increased environmental integration. Thus, my objective in the remainder of this paper is to analyze traits, opinions, and motivations of home gardeners in Washington State in order to examine whether home gardening can change personal levels of awareness, instigating environmentally based improvements to consumption habits. This leads to addressing how those personal improvements create collective actions among society and therefore the policy decisions made by society.

Specifically within the context of this work, I will begin by determining the influence of demographic characteristics on the activity of gardening. If the propensity to garden is impacted by education, income, race, gender, or the presence of children in a household, the outcomes of home gardening would likely be related to factors of these demographic characteristics. I hypothesize that the tendency to garden will not stem from demographic traits because it is expected that gardening’s role is related to the provision of food. Food provision is a requirement for all people, and therefore its role is not limited to affecting certain demographics.

Next, it will be important to determine if gardeners vary from non-gardeners in reported factors to explain food purchasing. If so, the reasons for which people garden may be related to the reasons people choose to purchase certain foods, suggesting commonalities between gardening and food purchasing decisions. Based on the consideration of gardening as a mode of environmental education, it is expected that individuals who garden will vary from those that do not in their concern for the environment when purchasing food. If gardening helps educate individuals about food, gardeners would likely show higher support for alternative agriculture practices reflected in their food purchasing decisions. A specific difference that is expected
between gardeners and non-gardeners is the importance placed on purchases of locally grown food. From our knowledge of gardening as a way to gain understanding of the constraints and possibilities of food produced in the local area, I hypothesize that gardeners place higher importance on purchasing locally produced food than non-gardeners. This encourages the use of gardening to foster locally based environmental respect and knowledge. A final hypothesis will suggest benefits of home gardening as including environmental, social, and personal advantages. If this hypothesis is proven correct, it would suggest that gardening can help inform people that their food habits are related to other facets of life, such as personal and community health. Previously, it was discussed that Marsden suggests that sustainable agri-food systems require this type of interconnectedness between food, society, and the natural environment. Gardening therefore could contribute to productive agri-food systems as defined by contemporary food system research.

**Methodology**

Data for analysis in this survey was provided by a consumer phone survey of residents of Washington State based upon the Dillman approach (Dillman 2007). Statistical multivariate analysis of data from 1027 survey respondents was performed. The individuals surveyed were self described as the person in charge of the majority of food-buying for the household. This survey, written by Dr. Raymond Jussiaume and Justin Smith of the natural resource department at Washington State University, along with Dr. Marcy Ostrom of WSU Center for Sustaining Agriculture and Natural Resources, and was completing by the WSU Social and Economic Science Research Center during November and December 2010.
Specific questions utilized for this research center on comparison between gardeners and non-gardeners. Initially, these two groups of individuals were compared demographically. Then, classical factors for explaining food purchasing were considered, comparing the two groups. Individuals were questioned on the level of importance they placed on a variety of factors when purchasing their food, relating to physical traits of the food, the foods availability, and social, environmental, or economic factors considered when purchasing food. The importance of local food production was analyzed comparing gardeners to non-gardeners, spread through income and education levels. By looking at the actions and attitudes towards food and social issues of those surveyed, a further understanding of the contemporary role of home gardening in the developed world is expected. The reported benefits of home gardening for gardeners will gauge the potential of gardening to address agri-food issues. Variations between gardeners and non-gardeners may suggest correlation between gardening and environmental education benefits. Understanding how gardening may contribute to the alternative agriculture movement will lend insight to how other acts of integration into natural resource issues will impact human behavior. I compared characteristics of gardeners to non-gardeners and looked at common traits, activities, and mindsets amongst gardeners that may relate these individuals to other aspects of alternative agri-food systems. The presence of meaningful statistical variation will be based upon use of Pearson’s chi-squared analysis.

**Results and Discussion**

Of the 1027 respondents to the survey, 582 indicated having a garden while 445 lacked a garden. To explore explanations for the activity of gardening, classic demographic indicators were first examined to compare traits of the food purchasing individuals whom have home gardens and those whom do not. This analysis sheds light on whether basic social characteristics
such as income level or race will alter the propensity to garden among Washington residents. Based on the analysis, demographic characteristics do not seem to be significantly associated with engagement in home gardening. Pearson’s chi-squared tests were used to compare individuals with home gardens to those without for five demographic traits. Neither gender (p-value = .397), education level (p-value = .896), income category (p-value .612), race or ethnicity (p-value .916), nor presence of children in the household (p-value 1.000) alter the likelihood of having a home garden (Table 1). The lack of correlation between gardeners and these selected demographic traits indicates that the strong possibility of some other factors which would lead people to pursue home gardening.

Table 1. Propensity to Garden by Demographic Characteristics.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Chi-squared</th>
<th>p-value</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children under 18 in household</td>
<td>4.9747</td>
<td>1.000</td>
<td>1006</td>
</tr>
<tr>
<td>Education level</td>
<td>9.3971</td>
<td>0.896</td>
<td>1005</td>
</tr>
<tr>
<td>Income category</td>
<td>11.9234</td>
<td>0.612</td>
<td>1004</td>
</tr>
<tr>
<td>Gender of major food purchasing individual</td>
<td>1.8463</td>
<td>0.397</td>
<td>1004</td>
</tr>
<tr>
<td>Race or ethnic group</td>
<td>5.9936</td>
<td>0.916</td>
<td>1004</td>
</tr>
</tbody>
</table>

Frequency of gardeners versus non-gardeners compared to demographic traits. Sample size (n) varies with missing data or individuals that failed to respond or answered “I don’t know.”

In order to determine whether gardeners share food purchasing preferences that may separate them from non-gardeners, the propensity to garden was compared to classical factors for explaining food purchases using bi-variate analysis. The importance of physical characteristics of purchased food does not appear to vary between gardeners and non-gardeners. No statistical difference between gardeners and non-gardeners was shown for the importance of freshness, price, taste, appearance, nutritional value, and food safety. Additionally, gardeners do not differ in how they value the importance of food being available year round or available where they usually shop, or in their preference of the availability of name brand foods. The importance of whether food was produced in an environmentally friendly or sustainable manner and whether or
not food is organic again does not vary based on the act of gardening. Two factors did show statistical difference between gardeners and non-gardeners. Gardeners were shown to place less importance on the ease of preparation of food, with over 37 percent of non-gardeners finding ease of preparation very important versus only 19.1 percent of gardeners (Table 2). Additionally, a greater percentage of gardeners expressed the attitude that local food production was either “somewhat important” or “very important” versus “not important.” Of gardeners, 42.6 percent found local food production “very important” versus 35.3 percent of non-gardeners (Table 2).

Table 2. Food purchasing factors which vary between gardeners and non-gardeners.

<table>
<thead>
<tr>
<th>Food purchasing factor</th>
<th>Survey response</th>
<th>Gardener (%)</th>
<th>Non-Gardener (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local food production</td>
<td>Not important</td>
<td>7.39</td>
<td>15.28</td>
</tr>
<tr>
<td></td>
<td>Somewhat important</td>
<td>49.66</td>
<td>48.99</td>
</tr>
<tr>
<td></td>
<td>Very important</td>
<td>42.61</td>
<td>35.28</td>
</tr>
<tr>
<td></td>
<td>Refuse or don't know</td>
<td>0.34</td>
<td>0.45</td>
</tr>
<tr>
<td>Ease of preparation</td>
<td>Not important</td>
<td>30.12</td>
<td>19.1</td>
</tr>
<tr>
<td></td>
<td>Somewhat important</td>
<td>50.77</td>
<td>45.62</td>
</tr>
<tr>
<td></td>
<td>Very important</td>
<td>19.1</td>
<td>37.3</td>
</tr>
<tr>
<td></td>
<td>Refuse or don't know</td>
<td>0.34</td>
<td>0.22</td>
</tr>
</tbody>
</table>

The percentage of individuals whom responded with each level of importance for the factors of “local food production” and “ease of preparation” are shown. n= 1027.

As gardening would be considered to require greater personal effort or time, it is understandable that those who choose to garden would additionally be less concerned with the ease of preparation of purchased food. These individuals seem to be more willing to take time to personally produce or prepare their food. While interesting, this correlation fails to produce an explanation for why individuals’ who garden show less concern for ease of preparation. The increased amount of interest placed by gardeners on local food production, however, may lead to insight as to the ability of the act of gardening to correlate to other alternative food purchasing choices. The presence of a correlation between purchasing locally produced food and gardening
suggests that similar ideals lead to both behaviors, and the desire to understand the development of these ideals lends the topic to further analysis.

Table 3. Importance of local production to gardeners of varied income level.

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Garden</th>
<th></th>
<th>Non-gardener</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Low income</td>
<td>Important</td>
<td>8</td>
<td>5.0</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Not import</td>
<td>16</td>
<td>9.9</td>
<td>66</td>
</tr>
<tr>
<td>Mid income</td>
<td>Important</td>
<td>19</td>
<td>3.8</td>
<td>272</td>
</tr>
<tr>
<td></td>
<td>Not import</td>
<td>29</td>
<td>5.8</td>
<td>180</td>
</tr>
<tr>
<td>High income</td>
<td>Important</td>
<td>105</td>
<td>57.1</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Not import</td>
<td>11</td>
<td>6.0</td>
<td>6</td>
</tr>
</tbody>
</table>

Both gardeners and non-gardeners were asked if the factor of local food production was important to them when purchasing food. There were 161 individuals of income less than $25,000 per year, 500 individuals with income between $25,000 to $100,000, and 184 individuals with income above $100,000 per year. Responses of “somewhat important” or “very important” for the importance of local food production were grouped to one category: “important.” Significant statistical difference of p-value= 0.00 shown for 57.1 percent compared to 5.0 or 3.8 percent.

When separating the survey respondents into income categories, a significant difference is seen between the high income views on the importance of local food production compared to those of low or middle income households. Here, low income indicates a household income of less than $25,000 per year, middle income between $25,000 and $100,000, and high income above $100,000. As shown in Table 3, a considerably higher number of high income gardeners (57.1 percent) consider local food production important compared to low or middle income gardeners (5.0 percent and 3.8 percent respectively). For non-gardeners, these differences are not as apparent, with percentages at 44.1, 54.4, and 33.7 for low, middle, and high income respectively.

This difference between high and middle or low income gardeners in the importance of local food production suggests a correlation between factors considered important to individuals and their ability to afford more alternative products. When the responses to the questions of gardening and the importance of local food production were separated according to the education
level of the respondent, these differences were not seen. Therefore, based on preliminary analysis it seems to be that economics is a more important explanatory factor for this difference rather than level of formal education. If low and middle income households are economically deterred from considering local food production when purchasing, we might expect that with lessened financial constraints more individuals would value local food production. Considering the impact of home gardening, it is interesting to see that this pattern was not seen for non-gardeners. Therefore, our high income gardeners have the highest response rate of considering local food production “important” compared to low or middle income gardeners or any income level of non-gardeners. The combination of gardening and lack of financial constraint when purchasing food signify a trend to find local food production important. Gardening potentially impacts these individuals in valuing locally grown goods, whereas financial constraints prevent the same impact amongst low or middle income gardeners.

High income gardeners might be motivated to garden for different reasons than low or middle income gardeners because the capability to afford local, fresh produce is not hindered by financial constraints as it is for those of lower incomes. In other words, if those of lower income levels desire fresh, local goods, the only way for them to afford these goods may be through self-production. High income gardeners on the other hand could afford to purchase these goods from local suppliers, so they apparently see some other benefits of home-gardening that motivates them to garden. This leads to an analysis of the benefits of home gardening reported by our Washington state gardeners.

The reported benefits of gardening to the gardening individuals were next analyzed to consider what motivations are more or less common to gardening households (Table 4). Gardeners ranked six motivations of gardening as either “very important,” “somewhat
important” or “not important.” Four of the six benefits were found by over 80 percent of individuals as either somewhat or very important, indicating that gardeners often perceive multiple benefits derived from their gardening experience. The benefit of providing fresh food appears important to the most individuals, and was ranked as very important by 78.0 percent of respondents, with only 3.8 percent noting it as not important. The garden as a source of recreation is either somewhat or very important to about 88 percent of individuals. The ability to ensure food safety and the ability to help improve environmental sustainability were ranked as very important by 55.8 percent and 53.8 percent of individuals, respectively. Only two benefits do not show greater than 80 percent ranking of importance by the majority of individuals. Reduction of food costs was fairly spread throughout the three rankings, with very important at 39.2 percent, somewhat important at 35.9 percent, and not important at 24.9 percent. Most people do not seem to have a garden as a way to connect with people in their community, as 61.0 percent of individuals rank it as not important, 26.1 percent as somewhat important, and only 12.9 percent as very important (Table 4). It is interesting though, when the same gardeners were asked if they shared extra fruits or vegetables with others, 70 percent answered yes. So while they may not feel as though their garden is important to connect with community members, there may be indirect community benefits

<table>
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<tr>
<th>Garden is important to:</th>
<th>Importance</th>
<th>n</th>
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<tbody>
<tr>
<td>be environmentally sustainable</td>
<td>53.8% 28.4% 17.9%</td>
<td>582</td>
</tr>
<tr>
<td>ensure safe food</td>
<td>55.8% 26.0% 18.2%</td>
<td>582</td>
</tr>
<tr>
<td>provide fresh food</td>
<td>78.0% 18.2% 3.8%</td>
<td>582</td>
</tr>
<tr>
<td>reduce food costs</td>
<td>39.2% 35.9% 24.9%</td>
<td>582</td>
</tr>
<tr>
<td>as source of recreation</td>
<td>45.9% 42.4% 11.7%</td>
<td>582</td>
</tr>
<tr>
<td>to connect w/ people in community</td>
<td>12.9% 26.1% 61.0%</td>
<td>582</td>
</tr>
</tbody>
</table>

Percentage of gardening individuals who find six traits either “very important,” “somewhat important” or “not important.”

Nilson 22
For five of the six gardening benefits, the majority of individuals express that the garden is either very important or somewhat important. This suggests that gardeners find multiple positive outcomes from their gardening activities, thus they may be motivated to garden for multiple reasons. The three benefits that show the highest percentage of ranking as either very important or somewhat important are providing fresh food, a source of recreation, and to be environmentally sustainable. Overlap exists between the individuals that find these benefits important; 75.1 percent of individuals rank all three of these benefits as “important” (combining the responses of somewhat and very as “important”). Twenty-nine percent of individuals find all three benefits as very important (Table 5). Basic demographics cannot explain the spread of individuals that garden, however since many individuals find multiple benefits to their gardening, perhaps it is the outcome of gardening relating to personal preferences in food and lifestyle quality that explains the spread of gardeners.

Table 5. Comparison of Top Three Reported Benefits.

<table>
<thead>
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<th>Percentage</th>
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<tr>
<td>Find all three very important</td>
<td>29.1%</td>
<td>571</td>
</tr>
<tr>
<td>Find all three somewhat important</td>
<td>5.3%</td>
<td>571</td>
</tr>
<tr>
<td>Find all three not important</td>
<td>0.7%</td>
<td>571</td>
</tr>
<tr>
<td>Find all three &quot;important&quot;</td>
<td>75.1%</td>
<td>571</td>
</tr>
</tbody>
</table>

Three-way comparison ranking response for gardening’s ability to provide fresh food, a source of recreation, and to be environmentally sustainable. Those that responded as either “refuse” or “I don’t know” for any of the three traits were excluded from comparison.

The highest ranking benefit of providing fresh food suggests the actual quality of the product produced plays a significant role in why individuals garden. It is interesting though that recreation and environmental sustainability are additionally ranked as important by most gardeners, and that 75 percent of individuals find all three benefits important. Gardening for these individuals thus incorporates the activity of food acquisition with other aspects of life in ways that simply shopping at a supermarket for food could not do. Although it was not asked in
this survey, we would not expect individuals who shop at supermarkets for groceries to rank their grocery shopping as important for environmental sustainability or recreation. While other alternative methods of food acquisition such as buying farmer-direct or organically produced products may very well show importance to individuals for sustainability, the fact that gardening partners recreation with sustainability and quality, fresh products make it a rather unique alternative method based on the connection to multiple benefits. This potential for broad-scoped impact emphasizes that home gardening may increase connections between people, their food habits, and their understanding of the challenges of providing food for a growing population.

**Conclusion**

Through this research, we saw that the propensity to garden does not appear to be effected by demographic traits of formal education level, family size, race, gender, or income. The multi-faceted benefits of home gardening suggest the possibility that people of all types of demographics can find benefits to gardening. This does not mean, however, that people of different demographic types do not have comparatively unique motivations for gardening. This supports the argument that gardening could be used as an informal environmental education tool for a diverse public. Next, we saw that gardeners varied from non-gardeners on only two of sixteen classical factors for explaining food purchasing. The correlation between gardening and the factor of “ease of preparation” is an expected correlation because gardening is an action of preparation, and therefore those who garden are less concerned with the ease of food preparation.

Additionally, gardeners were seen to value the importance of local food production more so than non-gardeners. A personal connection to an issue, by definition, creates a link between people and things or activities. Based on this preliminary analysis of home gardening, gardeners
may be tied to other modes of alternative agriculture, namely interest in local food production. This trend was significantly more prevalent amongst high-income gardeners. Without the data to reveal if one of the two related traits appeared first, it cannot be concluded with certainty which activity led to the other or if both traits occurred simultaneously amongst the citizens. Whether gardening may lead to increased local food purchasing or vice versa, the connection between the two modes of alternative production is significant. We can see that this connection suggests a relationship between gardening and local food production which deserves further consideration. There is a possibility that increasing consumer behavior towards either local purchasing or gardening may lead to an increased interest and action in the other activity. For the AAM, this domino effect would be beneficial and target the goals of alternative agriculture supporters. Marsden (2011) and Morgan et al. (2006) recognized the potential of considering “place” when searching for improvements to agri-food production. Gardening as a local source of food, with apparent ties to increased interest in local food purchasing, suggests the importance of place in understanding the growth of AAMs. A correlation between gardening and other purchasing factors that traditionally support alternatives agri-food systems, such as environmental sustainability or organic purchasing, was not discovered with this data analysis. Further analysis may lead to discovery of trends in these other factors for different demographic groups.

Finally, the multi-faceted benefits of home gardening reported by the gardeners surveyed suggest that gardening is capable of creating a connection between food production and cultural, recreational, and economic benefits for a community. With overlap amongst benefits found as important by gardeners, it is apparent that gardening contributes to a variety of positive outcomes, connecting a sustainable mode of food production to positive benefits for other factors which contribute to wellbeing, such as personal recreation. Based on these interdisciplinary
benefits reported, home gardening may be capable of fulfilling Marsden’s (2011) suggestion of embedded and interconnected agri-food systems.

For future research, in order to gain a more dynamic understanding of the impact of home gardening, it would be beneficial to further delve into the mindsets of gardeners. Especially interesting may be a comparison of behaviors and opinions of individuals before and after beginning a home gardening project. If attitudes and actions towards food provisioning change with the act of gardening, the benefits of the activity could be analyzed further. A recent discussion with a friend and gardener revealed to me the potential for this connection. He stated that after growing accustomed to the flavor and quality of home-grown tomatoes, any desire to purchase store-bought hot house tomatoes was eliminated. Having witnessed the growing process and result obtained from careful home production, he had an increased level of respect for the production of the fruit which resulted in distaste for their mass-produced counterparts grown out of season in a conventional fashion. After having this conversation, I realized that this type of data, where a person discusses their behaviors and reasoning, may be more beneficial for analysis of gardening than impersonal survey responses. While large surveys are important to gain a broad perspective of trends, the personal insight is missing. Additionally, it is difficult to prove cause and effect with the use of mass survey data. These factors are especially essential for study of the relationship between gardeners and their attitudes towards food issues. An option for future study of the potential of home gardening in developed societies might take a form more similar to that used by Clayton in “Domesticated Nature: Motivations for gardening and perceptions of environmental impact,” which was discussed previously.

As was also discussed, David Orr (1994) presented the argument that successful environmental education would increase understanding of the interconnectedness of multiple
subjects. Additionally, Ton Bührs (2009) suggested that personal recognition of environmental problems in everyday behaviors will be required to develop precautionary tactics for environmental issues. Based on the self-reported benefits of home gardening, it is implied that gardening may achieve these goals. For many gardeners, benefits overlap between factors of environmental friendliness, economics, product quality, and recreational opportunities. Therefore, gardening has interdisciplinary benefits for increasing understanding of the potential of food acquisition to fulfill a role beyond satiation of human food requirements. Marsden’s (2011) call for embedded and connected sustainable food systems may benefit from consideration of home gardening as an integral component.

The potential for personal experiences to form a sense of respect could impact problem resolution practices for all environmental problems. Home gardening relates to the agri-food system much like water usage relates to local watershed health, or paper usage to deforestation. If personal experiences to these connections can increase individual understanding leading to altered behaviors, a challenge for environmental education would be to incorporate these experiences into the lives of the human population. Home gardening deserves further consideration in improving environmental education and sustainable agri-food systems. Its potential also suggests that a variety of activities which integrate participation in fulfillment of human needs would be beneficial. Harboring appreciation and action amongst people creates an atmosphere for proactive environmental management. Proactive solutions prove to be more sustainable over long time periods than solutions which instead treat symptoms of an issue and not the cause. In this work home gardening has been presented as an example of a way to increase interactive environmental education. The goal of this work therefore has been to portray that increased use of such modes of education is a way in which successful and
sustainable solutions to environmental conflicts and crises can develop and perpetuate in contemporary society.
References Cited


Survey Questions

(Abbreviated from the original survey to the specific questions used for this research)

BEGIN
Hello, my name is (name) and I am calling from Washington State University. I have a few questions about your food shopping preferences and personal well-being. Responses to this survey will help the University’s educational and outreach programs across the State. (The survey takes about 15 minutes to complete).

May I speak to the person living in this household, 18 years or older, who is most involved with food buying for the household?

CONFIDENTIAL
This interview is voluntary and all of the information you provide will be kept confidential and no names will ever be associated with your responses. If I come to any question you prefer not to answer just let me know and we can skip over it. This interview may be monitored by my supervisor as a way to check my work.

Q1A
I’d like to begin by asking about your household’s food shopping patterns. First, I’d like to ask about the factors that are important to you when buying food.

The first factor is FRESHNESS. Is this factor: Not important, somewhat important or very important to you when buying food for your household?

1.  Not important
2.  Somewhat important
3.  Very important
D.  Don’t know
R.  Refuse

Q1B
The next factor is PRICE. Is this factor: Not important, somewhat important or very important to you when buying food for your household?

1.  Not important
2.  Somewhat important
3.  Very important
D.  Don’t know
R.  Refuse

Q1C
(The next factor is) TASTE. (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1.  Not important
2.  Somewhat important
3.  Very important
D.  Don’t know
R.  Refuse

Q1D
(The next factor is) the AVAILABILITY OF NAME BRANDS. (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1.  Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1E**
(The next factor is) **YEAR ROUND AVAILABILITY.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1F**
(The next factor is) **APPEARANCE.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1G**
(The next factor is) **EASY TO PREPARE.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1H**
(The next factor is) **AVAILABLE WHERE YOU USUALLY SHOP.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1I**
(The next factor is) **ORGANICALLY GROWN.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1J**
(The next factor is) **NUTRITIONAL VALUE.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1K**
(The next factor is) **SAFETY.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?) IWR DEFINITION: *Meaning that your food is safe in terms of contamination from chemicals or food borne illness, such as E. Coli.*

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1L**
(The next factor is) **GROWN OR PRODUCED LOCALLY.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1M**
(The next factor is) **GROWN OR PRODUCED IN AN ENVIRONMENTALLY FRIENDLY MANNER.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1N**
(The next factor is) **GROWN OR PRODUCED IN A SocialLY RESPONSIBLE MANNER.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?) IWR DEFINITION – *For example, farm workers are given living wages, and are provided a safe working environment.*

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

**Q1O**
(The next factor is) **GROWN OR PRODUCED IN WASHINGTON STATE.** (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

Q1P
(The next factor is) HELPS KEEP LOCAL FARMERS IN BUSINESS. (Is this factor: Not important, somewhat important or very important to you when buying food for your household?)

1. Not important
2. Somewhat important
3. Very important
D. Don’t know
R. Refuse

Q7
Did you or anyone in your household grow a garden for fruits and/or vegetables this year?

1. Yes
2. No
D. Don’t know
R. Refuse

Q11 IF Q7=1, D, R AND Q8=1, D, R go to Q12A, else continue
Please tell me what is the MAIN REASON you do not grow vegetables or fruit for your household? Is it because you have…

1. NO GARDEN SPACE
2. IT TAKES TOO MUCH TIME
3. IT IS TOO EXPENSIVE
4. YOU ARE NOT INTERESTED IN DOING SO
5. OR SOME OTHER REASON, Please specify: (open-end)
D. Don’t know
R. Refuse

Q12A IF Q7=2, D, R AND Q8=2, D, R go to Q13, else continue
Please tell me how important the following benefits of gardening are to you.
How important is your garden as a SOURCE OF RECREATION? Would you say this benefit is: Very important, somewhat important or not important to you?

1. Very Important
2. Somewhat Important
3. Not Important
D. Don’t Know
R. Refuse

Q12B
How important is your garden as a way of CONNECTING WITH FAMILY? (Would you say this benefit is: Very important, somewhat important or not important to you?)

1. Very Important
2. Somewhat Important
3. Not Important
D. Don’t Know
R. Refuse
Q12C
(How important is your garden as a way of) CONNECTING WITH PEOPLE IN YOUR COMMUNITY? (Would you say this benefit is: Very important, somewhat important or not important to you?)

1. Very Important
2. Somewhat Important
3. Not Important
D. Don’t Know
R. Refuse

Q12D
(How important is your garden as a way of) REDUCING FOOD COSTS FOR YOUR HOUSEHOLD? (Would you say this benefit is: Very important, somewhat important or not important to you?)

1. Very Important
2. Somewhat Important
3. Not Important
D. Don’t Know
R. Refuse

Q12E
(How important is your garden as a way of) ENSURING THE SAFETY OF YOUR FOOD? (Would you say this benefit is: Very important, somewhat important or not important to you?)

1. Very Important
2. Somewhat Important
3. Not Important
D. Don’t Know
R. Refuse

Q12F
(How important is your garden as a way of) PROVIDING FRESH FOOD? (Would you say this benefit is: Very important, somewhat important or not important to you?)

1. Very Important
2. Somewhat Important
3. Not Important
D. Don’t Know
R. Refuse

Q12G
(How important is your garden as a way of) BEING ENVIRONMENTALLY SUSTAINABLE? (Would you say this benefit is: Very important, somewhat important or not important to you?)

1. Very Important
2. Somewhat Important
3. Not Important
D. Don’t Know
R. Refuse

Q19
Now I have just a few background questions. How many adults, 18 years or older, INCLUDING yourself lived in your household last year?

$E 1 99
D. Don’t know
Q20
How many children, less than 18 years old, lived in your household last year?

$E 1 99$
D. Don’t know
R. Refuse

Q23
May I have your zip code?

$E 00000-99999$
D. Don’t know
R. Refuse

Q24
What is your current age?

$E 18 99$
D. Don’t know
R. Refuse

Q25
What is the highest level of education you have completed?

1. Less than high school degree
2. High school degree
3. Some college
4. Vocational degree
5. College degree
6. Some postgraduate work
7. Post graduate degree
D. Don’t know
R. Refuse

Q26
Please tell me which race or ethnic group or groups describe you. (Are you…)

1. Spanish, Hispanic, Latino, or Chicano
2. Black, African American
3. American Indian
4. Asian (including Asian Indian)
5. White, but not Spanish, Hispanic, Latino, or Chicano
6. Other (please specify) (open-end)
D. Don’t know
R. Refuse

Q27
“For survey purposes I need to ask are you male or female”)

1. Male
2. Female
R. Refuse
Q28
Please tell me which income category best describes your household income for 2009, before taxes and other deductions. Please stop me when I reach the correct income category.

1. Less than $15,000
2. $15,000 up to $25,000
3. Over $25,000 up to $50,000
4. Over $50,000 up to $100,000
5. Over $100,000 up to $250,000
6. Over $250,000
D. Don’t know
R. Refuse

THX
That was my last question. Thank you for your time today. We appreciate your time and cooperation. Do you have any additional comments or questions you would like to add?
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Thesis Title

Home Gardening’s Contribution to the Alternative Agriculture Movement

Thesis Presented

Spring 2012

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