The Grass is Not Always…Economically Beneficial

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Introduction

Sustainability in a community by way of the built environment is something with which ecologically-conscious architects may be in tune; however, the public often overlooks it. While the typical homeowner has reasons to feel positively or negatively towards a landscape design, their opinions are most often based on preferred aesthetics that have been influenced by current trends or tradition of the area. They fail to consider the myriad other reasons why they should value the thought behind a design. Thus, their aesthetic views win over when a realtor is calculating the value of a property. Meanwhile, those overlooked reasons are the considerations for landscaping that could make a significant difference for the energy use levels, environmental sustainability, and economic resiliency of a community. If the citizens of an area understand these hidden purposes behind a thoughtful landscape design, they can adjust their preferences accordingly, and maintain beautiful cities while also combating climate change.

Thesis and Elements

What the public may think of as successful landscape design widely ignores long-term and intangible effects. For example, while transplanted species of plants look pretty, they could have an adverse effect on the biodiversity of the area and could have trouble surviving. Also, the costs associated with maintaining the health of a plant are often overlooked or seen as normal and expected, such as regular watering with sprinklers. When resilient, energy-efficient species, structures, and materials are designed into a landscape, the public over the long term sees benefits such as business opportunities due to higher walkability scores, and an increase in energy efficiency. **Educating the public on the topic of environmental sustainability of landscaping would have the effect of benefiting communities economically by making these places desirable for businesses to settle and patrons to frequent, while also costing less over the long term in maintenance and other environmentally-related fees.**

I have a unique perspective on this issue because I have a design background and therefore I notice landscape design, but also because I have spent multiple years of my life living in a densely populated yet pedestrian accessible urban environment, and several years in suburban environments where I feel discouraged from walking or biking at all due to lack of shade, safety, or accessibility. I wanted to learn more about the economic benefits of shifting to more environmentally friendly landscaping trends, in order to be able to make a triple-bottom-line case for the change. I found that the economic benefits were not widely discussed among typical homeowners, and so this research is to make a case for more widespread education.

In my collection of research, I will seek a variety of information. First, I will discuss the harmful effects of unsustainable landscaping both to the environment and economically, followed by the positive effects of introducing sustainable planning of landscaping, care practices, and larger mentality shifts. I will also address research regarding how public mentality currently operates under pressures from corporations or social pressures, and how that perspective can change with effective education strategies. In fact, there are already some community strategies in place. In my examination of economic benefits, I will collect research on how much energy is saved by sustainable choices, and how much a community can save and gain monetarily over a longer period of time by fewer maintenance needs and greater draws for commerce.

Definitions

This study will be using the definition of sustainable landscaping gathered from the University of California's Division of Agriculture and Natural Resources. It states that sustainable landscaping "involves selecting plants that are adapted to your climate and microclimate and implementing maintenance practices that reduce water waste, protect water quality, nurture soil, recycle organic matter, incorporate integrated pest management (IPM), protect and encourage desirable wildlife, and conserve energy" (Hartin et al., 2014). Therefore, this paper will aim to address the economic and environmental benefits of all the aforementioned aspects.

Scope

The literature reviewed will be gathered from sources with no limit on location, as every community's individual experience with creating and implementing sustainable landscape practices will be relevant to informing the process of transition. However, some sources will focus on information from the area of Tampa, Florida. This area was chosen because it is the area of my residence.

Objectives

Through this research I aim to first draw attention to the lack of focus or initiative to implement sustainable landscaping practices in both Tampa, Florida and in the United States as a whole. In the course of examining the status quo I hope to reveal the causes underlying this complacency, whether the pushback is economic, social, logistic, or otherwise.

After making a claim for the absence of effort towards more sustainable landscaping, it will be helpful to address how the public may more easily adopt a favorable mindset to change. This can be achieved through uncovering economic incentives for a shift, and a reassurance that in converting landscape to more sustainable options, aesthetics are not compromised.

Finally, the research can touch on practical approaches to education advocating sustainable landscaping alternatives. It will aim to cover programming already in place that has been successful, and future applications.

Methodology

In this study I searched for data that discussed the reasons why people choose landscaping, whether they be residential homeowners, homeowner associations, or business owners. I wanted to know the underlying reasons why it seems that the United States is overwhelmingly covered in turf grass, and if the trends were perhaps changing. I was also interested in what created those trends.

I then wanted to find information regarding how sustainable landscaping could possibly make a difference environmentally, and in what ways. This wider search led me to narrow the benefits of sustainable landscaping down to two categories: conserving and protecting resources, and providing habitats for animal and insect species.

From an economic standpoint, I then searched for ways in which planning landscaping in order to conserve resources and provide habitats could save money. I was led also to information regarding how to care for landscaping in ways that also achieved this goal.

Finally, I was interested in learning more about how citizens of the United States may be in the process of working towards a trend of more sustainable landscaping, through education of its importance.

Findings

In looking for reasons why people choose landscaping, I tied the decisions back to first the history of settlers in the United States, who needed large swaths of lawn to graze their sheep. However, I found that the trend in landscaping that uses copious amounts of water to maintain is perpetuated by an unregulated market for landscaping companies, and therefore their efforts to gain higher profits. Unproductively, mentalities among homeowners have very little reason to shift from these powerful forces, because socially, they believe that an ideal neighbor prefers lower levels of native plants and higher levels of pristine, weed-free turf grass.

When studying how sustainable landscaping can make a difference, I found that landscaping can provide a habitat for animal and insect species, and that perhaps the decline in species in the country can be attributed to growing suburban lawn surface area in the country. It was also clear that planning landscaping strategically could lower temperatures and prevent evaporation enough that it could significantly lower water use. Care methods are also shown to reduce water use, such as drip irrigation. To prevent pollution, landscaping should include rain gardens, and avoid provoking rainwater runoff into local surface waters. Landscape caretakers use harmful fertilizers and pesticides which can contaminate surface water.

Apparently, sustainable methods of caring for landscaping are also less expensive than more widespread methods of cleaning stormwater and irrigating lawns and plants. Additionally, sustainable landscaping choices can have the effect of attracting people to a business by increasing local walking scores and increasing worker productivity, with methods such as increasing shade strategically.

Regarding education, there are programs in place which encourage certification of staff members who will have a hand in caring for landscaping and choosing it, so that they become aware of best practices. In communities, there are initiatives which discourage chemical use on landscaping and offer alternatives to fertilizer. Also, there are community opportunities to get involved in education, like the decoration of storm drains.

Policy Implications

The clearest policy implication found was the lack of regulation from state and local governments working to counteract choices developed due to capitalist goals. Without this regulation, companies are able to convince homeowners to make landscaping choices which will increase profit, even if those choices are unsustainable to the environment. If I were to make a recommendation, it would be to create more policy to require soil moisture sensors and other technology which can easily reduce water usage, and to require a certain amount of ground cover to consist of native plants, versus just turf grass.

Conclusion

In summary, landscaping practices in the United States leave a lot to be desired from an environmental sustainability standpoint. We are rooted in old habits, perpetuated by an unregulated market and peer pressure. There are several accessible and affordable ways to plan and care for landscaping more sustainably. People may not be aware of these options, but education programs and certification requirements are working to correct that disparity. Switching to a mentality favoring sustainable landscaping is not only more helpful in combating and mitigating climate change, but it will save individuals and firms money over longer the long term.

Literature Review

Landscaping choices which are solely based on aesthetic trends, cultural norms, or ease of installation are the culprits for a slew of environmental concerns that are working to progress the global issue of climate change. One effect is the pollution of surface waters such as local ponds, lakes, and rivers due to runoff of chemical fertilizers and pesticides applied to lawns and gardens. Lawn is "the largest irrigated crop in the United States in terms of surface area, taking up more space than even corn" (Lindsey, 2005). The space that short grass is taking up is space that is not offering any sort of benefit to species that live in these American areas, such as homes, protection, and food. Therefore, it is depriving the country of space for these needs. Specifically, the country's love of lawn has "ousted local bird species and allowed a few species to dominate that are particularly suited to living among humans and houses" (Bormann et al., 2001). Cumulatively, this decline in species can account for serious damage to local biodiversity. By decreasing these resources for animals and insects, humans are missing out on the health benefits and balance those species bring to the ecosystem of the community. Moreover, lawns contribute to surface water pollution because they are too dense to allow rainwater to soak directly into the groundwater slowly enough. Construction practices and daily use condense the lawn even more, and rainwater ends up in drains (Anacostia Restoration Team, 1991). When rainwater runoff gets directed to surface water, it often takes polluting particles with it, and could cause erosion over time.

Not only are lawn and other unsustainable landscape practices harming the environment through pollution and hits to biodiversity, but they are soaking up exorbitant amounts of precious resources. According to the University of California's Division of Agriculture and Natural Resources, "About one-third to one-half of water used by a typical California family is directed at outdoor irrigation, averaging about 200 gallons a day." This takes a toll on water infrastructure over time (Hartin et al., 2014). This issue needs to be considered holistically, because a choice towards rocks, per say, instead of a more water-demanding set of plants or grass could alternately affect the amount of electricity a household uses. The water is saved, but instead residents find themselves using more electricity for air conditioning and other cooling methods because the rocks do not mitigate heat in warm areas of the nation (Doxon, 1996).

Citizens may be even more jarred to find out how much money is spent on this energy and natural resources. According to the US Environmental Protection Agency, "the lawn care industry is a $32 billion per year industry, and the maintenance costs of the average lawn in this country average between $400 and $700 per acre. This amount is significantly higher than corn, rice, or sugarcane" (2005). Of course, the market plays a role in increasing prices for lawn care. Residents with lawns in the US are willingly feeding into this lucrative system, when the

willingness is actually present among people spending this money to make a shift. A study found that "middle income neighborhoods with high levels of home ownership may prove most receptive to initiatives aimed at increasing the use of more sustainable landscaping" (Peterson et al., 2012).

So, what can the country do instead and how will it help? First, sustainable landscaping is invaluable for the care of the nation's ecosystems. It can address the aforementioned negative effects with powerful benefits. Planting more trees and diverse plants and foliage instead of just lawn can help to clean the air (Hartin et al., 2014). More fauna means more photosynthesis to take in carbon dioxide, and if the aim is to combat climate change the globe needs to be creating and protecting carbon sinks as much as it lowers emissions to reach our carbon neutral goals. In addition to carrying out its natural air cleaning processes, plants and trees could work to create habitats for animal and insect species even when not directly devoted to that cause, as in a wildlife preserve, for example (Brown, 2009). Logically, survival of these species should not have to depend on protection from governmental organizations or nonprofits which may not receive consistent funding when every front and back yard owner in the country can be providing enormous help.

After the installation of more sustainable landscaping, there are accessible ways to care for it in ways that create less pollution. For instance, the Tampa Bay Estuary Program prohibits the use of nitrogen and phosphorus on lawns and plants from June 1st to September 30th each year. The program produced a news release which explained to residents how to read the labels on bags of fertilizer to avoid these chemicals, and suggested alternatives such as iron, micronutrients such as zinc and manganese, manure, and compost to enrich their yards instead (O'Hara, 2017). Community regulations like these may be difficult to enforce, but when accompanied by literature on how to find other options, the public can begin to alter their habits. Interestingly, homeowners often use too many chemicals on their lawns and gardens in the first place because if the methods are considered good for their yards, then they assume that adding more would bring even greater benefit, when this is usually not true (Brown, 2009). Alternately, if citizens are opting for lawn care companies to care for their yards, or businesses are looking to pollute less, Sanagorski and Monaghan (2013) recommend a couple of ways to protect local surface water. First, they suggest that fertilizer be handled only by those "certified in Green Industry Best Management Practices (GI-BMP)." If funds are available to hire trusted personnel for the application of chemicals, then programs like the GI-BMP can have a wider reach than perhaps individual homeowners seeking best practice information. Also, they mention that grass clippings should stay on the lawn, instead of falling down storm drains. Yard waste directly transports chemicals from lawns to local ponds, lakes, and rivers.

Additionally, there are simple ways to alter daily landscaping care habits that effectively conserve water. Even simple additions to a garden, such as mulch, can make a significant difference in how much water is needed. Just a thin layer of mulch "reduces soil evaporation, controls weeds, reduces erosion, buffers soil temperature, reduces compaction, and prevents bark damage on trees from string trimmers and lawnmowers" (Hartin et al., 2014). Mulch is an easy shift to make towards more sustainable landscaping because it already fits into what Americans consider an aesthetic norm. Also, irrigation methods can be improved to conserve water by installing drip irrigation systems. Drip methods such as "soaker hoses, drip tape, porous pipe, mini-sprinklers, and laser tubing….are not difficult to install" and work to bring water more efficiently to plant roots to reduce evaporation (Hartin et al., 2014). Some of these devices are compatible with other built environment innovations such as rain collection barrels. For larger

yards and businesses, it is recommended that the landscaping staff attend a landscaping irrigation program to learn efficient methods, and for these places to use soil moisture sensors to irrigate only when the soil is dry (Sanagorski & Monaghan, 2013). Thus, there are technology options and education options available for people who find out about their existence and have a willingness to take the small steps towards a more environmentally friendly yard care routine. Changes such as these for an establishment are comparable to the innovation of installing motion sensors to lighting, but just may not be as forefront in public knowledge of greener practices.

Aside from caring for landscaping in more thoughtful and efficient ways, there is substantial information available on how to plan what kind of landscaping to choose and where to place it, among other tactics, that can lessen a landscape's impact on the natural environment. Strategically harnessing plants' natural cooling effects is one step. Plants and trees can affect air temperatures when providing shade, and ground temperatures when chosen as an alternative to black top or concrete. Specifically, "air temperatures under shade trees can be 20 degrees or 25 degrees cooler than air temperatures above blacktop" and "temperatures just a few inches above turf and groundcovers can be up to 20 degrees Fahrenheit cooler than above black asphalt and 12 degrees cooler than above lighter-colored concrete surfaces" (Hartin et al., 2014). So, simply covering more surface area by shading trees and groundcover than with blacktop can really make a significant difference in how a homeowner or business experiences their yard. If strong enough an effect, then the placement of this landscaping could even have an effect on home utility use, particularly indoor cooling. Another option for reducing water use is the installation of rain gardens. A rain garden is a 4- to 8-inch deep hole in the ground where water can sit after a heavy rainfall and sink into the ground at a slower pace, with the help of natural wetland plants that provide an ecosystem for insect species as well (Brown, 2009). Rain gardens effectively address the issue of rainwater runoff taking polluting particles with it into surface water, and helps to restore underground aquifers. Water scarcity and pollution is one of the largest environmental challenges that my area of Tampa, Florida faces.

There is a strong economic argument behind shifting to more sustainable landscaping and care as well. As stated previously, thoughtful landscaping placement and care could contribute to a decrease in water use and electricity used for cooling (Hartin et al., 2014). Rain gardens also have a greater scale application, as when they serve entire municipalities they are referred to as bioretention facilities, and are better for the wallet than typical, more expensive stormwater management infrastructure (Brown, 2009). Water and energy costs aside, sustainable landscaping can have a major impact on the functionality and draw of a business or community. The planning of fauna around a building can "have a positive effect on mood, health and activities, and employee retention" which could increase productivity in office settings (Doxon, 1996). If a company can plant effective trees and foliage at low cost, then with sustainable and cost-effective care mentioned previously, it can sustain this nature over time and reap these human benefits, on top of all the environmental benefits mentioned. Actually, "landscaping has the greatest ROI on property values before selling," and also has the power to draw customers into a business (Doxon, 1996). Uniquely, Robinson, et al. (2017) did a study on the ROI of edible landscaping in the area of Phoenix, Arizona. Figure 1 displays the ROI if ten percent of the landscaping is harvestable. This scenario gives yet a new perspective on how sustainable landscaping could be a money-saving venture.

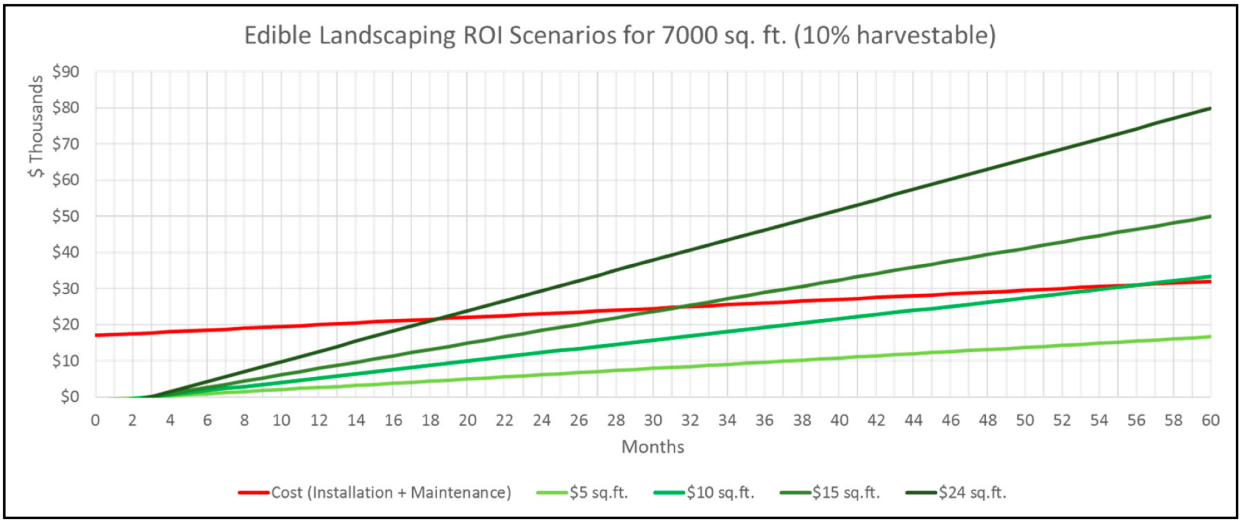

Figure 1. (Robinson et al., 2017)

There is clearly a motivation present to improve the landscaping of any establishment or household, and therefore the next step for these parties is to choose the options which produce shade, do not require copious amounts of water, are native to the area and therefore jive with the insects, animals, and climate qualities present, and all the while avoid sacrificing aesthetics. This may seem like a laundry list of requirements, but the choices will be easy and natural as long as no negative pressures are at play.

Thus, the next topic to address is what pressures are working to keep unsustainable landscape choices in place, and how to counter them. Robinson et al. (2017) state regarding landscaping service companies that "it must be acknowledged that the profit maximization prerogatives of for-profit private enterprises acting within contemporary market systems have historically led them to carry out unsustainable behaviors in the absence of strong market regulation." Consumers who hire these companies tend to default to these corporate choices because they trust that the options offered are the best or most informed ones. However, they would be failing to recognize these money-making schemes. Homeowners also fall into the pressures of for-profit firms, as firms tactfully feed consumers information which promotes the idea that the ideal neighbor must keep their lawn green and free from weeds (Brown, 2009). In reality, a study conducted to survey resident trends found that native plants were preferred over turf grass. Respondents "preferred a 50% native plant garden design over 100% turf grass…and inaccurately assumed that their neighbors preferred turf" (Peterson et al., 2012). See Figure 2.

Figure 2. Percent of Native Plants Versus Turf Grass (Peterson et al., 2012)

The study concluded that "correcting erroneous assumptions about neighborhood preferences may alleviate normative pressure against adopting alternatives to turf grass landscaping" (Peterson et al., 2012). What is more, the country's tradition of covering so much space with lawn is an antiquated tradition. Originally, when settlers from England were colonizing the United States, they planted lawns to feed their sheep (Bormann et al., 2001). It is astounding how many years this tradition has been perpetuated, either by lack of a perceived need for change or by corporations searching for profit.

Education is happening on a community level and a corporate level. The City of Tampa has a storm drain marking program, through which members of the municipality can propose storm drain locations they would like to decorate with messages that remind the public about where storm drain water goes: straight to local surface waters (2022). See Figure 3.

Figure 3. Storm Drain Marking Program. (City of Tampa, 2022)

This is an engaging program idea that positively reminds residents to take care to avoid directing yard waste towards storm drains. On a corporate level there is social pressure to comply with best practices in order to be able to tell the public that the company cares about the environment–a factor that many consumers value. On a community level, there are pushes for the boards of homeowner associations to learn about local and state regulations (Sanagorski & Monaghan, 2013). With sustainable management practices championing a prioritization of stakeholders over shareholders, appealing to the public by showing an ecological initiative is a smart business decision. Homeowner associations, on the other hand, can take pride in sustainable practices to show their residents they care.

Of course, there is a larger mentality shift that can be made in conjunction with the move towards small initiatives. Pertaining to businesses who want to appeal to their stakeholders, there is a greater business model overhaul that can happen in order to instill more sustainable values into the entire landscaping care company, in every department. Robinson, et al. (2017) argue that "certain urban landscapes would be better served with a different landscape approach, one that better recognizes functional interactions between and within landscapes, and enables multifunctional landscape design and use." It is suggested that multifunctional landscape could be a positive business model shift, if businesses serve multiple adjacent and interacting landscape spaces. Additionally, on a smaller scale an individual perspective shift will need to be influenced by outside forces. Above mentioned studies have found that homeowners tend to follow the tradition of American culture as well as social pressure from neighbors and suggestions from landscaping firms in order to make their yard decisions, and therefore education is needed to catalyze this mentality shift.

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