

# Using Perceived Landscape Benefits to Subgroup Extension Clients to Promote Urban Landscape Water Conservation<sup>1</sup>

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## Abstract

Because a large percentage of water used in urban areas can be applied through irrigation, home landscape management practices are an important factor of water conservation (Saurí, 2013). The information presented in this document was the result of a cluster analysis used to identify meaningful subgroups among home irrigation users to encourage water conservation behaviors. A three-segment solution emerged and groups were labeled necessary irrigators, water-saving reward-seekers, and moderate landscape appreciators. Ultimately, an understanding of these groups can help determine which audiences benefit the most from basic or complex water conservation practices.

## Introduction

Protection of water resources is one of the most important issues for Extension professionals. Urban and suburban landscapes cover over 115 thousand square miles in the United States (Saurí, 2013). These landscapes are characterized by large amounts of turf grass which require a considerable amount of water for maintenance (Jenkins, 1994; Kaplan, Myint, Fan, & Brazel, 2014; St. Hilaire et al., 2008). Additionally, more than half of a home's water consumption may be used for irrigating lawns and landscapes (DeOreo, Mayer, Dziegieleski, & Kiefer, 2016; Kaplan et al., 2014; St. Hilaire et al., 2008). In warmer areas such as Florida, this amount could approach almost 90% of a household's

water use (Haley & Dukes, 2012). In addition to specific sectors (e.g., agriculture, industry) competing for water resources, increasing urbanization places further strain on water demand (Saurí, 2013). Urban residents are important decision makers for conservation in the landscape, and therefore are one of the main target audiences of Extension water conservation programs. Notably, educational water conservation campaigns can have mixed results on long-term behaviors (Larson, Casagrande, Harlan, & Yabiku, 2009; Saurí, 2013; Syme, Nancarrow, & Seligman, 2000; Warner, Lamm, Rumble, Martin, & Cantrell, 2016). Thus, Extension professionals can consider new approaches in water conservation programs to encourage long-term behavior change. This publication highlights a different approach to long-term water conservation behaviors that can be implemented by Extension professionals.

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# Promoting Residential Landscape Water Conservation Behaviors Using Perceived Landscape Benefits

We surveyed 1,620 United States urban residents with irrigated landscapes to:

- segment them into meaningful subgroups based on benefits they perceived from residential landscapes,
- explore relationships among identified subgroups and their water conservation behaviors, and
- describe identified subgroups and label them based on their characteristics.

Cluster analysis is a statistical technique used to identify the number of subgroups that will result in the greatest differences among groups (Burns & Burns, 2008). We used cluster analysis to segment residents into subgroups based on the benefits they perceived to get from their landscape. By appealing to the benefits that residents value the most from their landscapes, Extension professionals can encourage water conservation behaviors.

Eight categories were developed to capture why residents valued their landscapes. These eight landscape benefits are described below.

- *Aesthetic benefits*—The landscape is enjoyable to look at, screens unwanted views, is aesthetically pleasing
- *Environmental benefits*—The landscape reduces erosion, absorbs pollutants, improves air quality
- *Food benefits*—The landscape provides fruits or vegetables, is a source of food, provides a space to garden
- *Habitat benefits*—The landscape attracts wildlife, supports pollinators, provides a home for birds
- *Health and comfort benefits*—The landscape improves health, reduces noise, increases privacy, provides oxygen
- *Monetary benefits*—The landscape increases my property value, helps me save money, increases my home's resale value
- *Social benefits*—The landscape shows my neighbors that I care, increases sense of community, provides a place to socialize, encourages conversations with neighbors
- *Well-being benefits*—The landscape provides a space for recreation, is a place to relax, is a source of inspiration, provides a sense of place

We asked respondents how much or how little they valued the individual items in each of these categories to measure how much they valued the eight overall benefits. The level of value associated with each of the benefits, which could range from one to five, was used to conduct the cluster analysis. We also asked whether residents engaged in specific water conservation practices and how likely they were to do so in the future.

## Differences Among Identified Subgroups Based on Perceived Landscape Benefits

From the cluster analysis, three subgroups emerged. Residents were placed in one of three categories based on their perceived landscape benefits. We expected to find groups that valued only one or a few of the eight values, but the cluster analysis indicated that the resulting subgroups valued the benefits somewhat consistently, and there were low, medium, and high-value subgroups. For example, those who valued their landscapes for aesthetics the most were grouped in the high category. Based on the benefits perceived by U.S. urban residents, we were able to segment them into three meaningful subgroups. Results showed that, across all categories, the water-saving reward-seekers had the highest overall perceived benefits, the landscape appreciators perceived a moderate level of landscape benefits, and the necessary irrigators had the lowest overall perceived benefits. See Figure 1. Using descriptive statistics, we characterized each subgroup (Table 1).

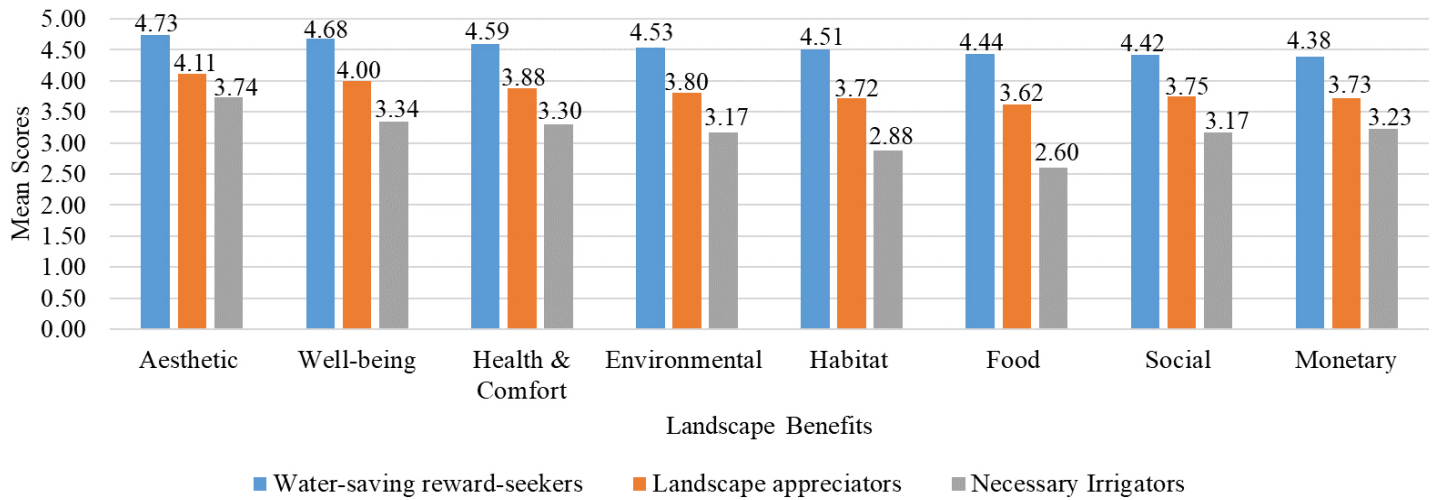


Figure 1. Perceived benefits and subgroups.

Table 1. Characteristics of each segment.

Characteristics	Necessary Irrigators	Water-saving reward-seekers	Moderate landscape appreciators
Education	4-year college degree	4-year college degree	4-year college degree
Average age	41	39	40
Sex	Males	Females	Females
HOA penalties	Yes	Yes	Yes
HOA rewards	No	Yes	Yes
Home ownership	Own	Own	Own
Use landscaping company	No	No	No
Income /year	\$50,000 to \$74,999	\$50,000 to \$74,999	\$75,000 to \$99,999

Characteristics for the necessary irrigators included landscape maintenance as required by their HOA, penalties if landscapes were not maintained, the lowest perceived benefits in all categories, and less current engagement in water conservation practices. Individuals in this group were engaged in approximately seven of the seventeen current conservation behaviors on average. The water-saving reward-seekers were characterized by mostly females who belonged to an HOA and had both penalties and rewards for the look of their landscapes. This group also had high perceptions of aesthetic and well-being benefits. Individuals in this group were engaged in approximately ten of the seventeen current conservation behaviors on average. Landscape appreciators were defined as belonging to an HOA with penalties imposed for the look of their landscapes, but with no rewards. This group also had high perceptions of aesthetic benefits in their landscape, implying an appreciation for a manicured lawn regardless of rewards. Individuals in this group were engaged in approximately nine of the seventeen current conservation behaviors on average.

Having identified and characterized each segment, we then looked at how membership in a subgroup related to future landscape water conservation practices. We explored seventeen water conservation behaviors that included calibrating sprinklers, seasonally adjusting irrigation times, and converting turf-grass areas to landscaped beds. We then compared the means for the future likelihood of engaging in water conservation practices for each subgroup, then calculated an overall average across the eight benefits of each subgroup (average landscape benefits). We found that (see Figure 2):

- the water-saving reward-seekers were the most engaged in water saving practices and reported the highest overall value of landscape benefits,
- the moderate landscape appreciators were somewhat likely to engage in water conservation practices and valued landscape benefits at a moderate level, and
- the necessary irrigators had both the lowest likelihood of engaging in water conservation practices and the lowest value of landscape benefits.

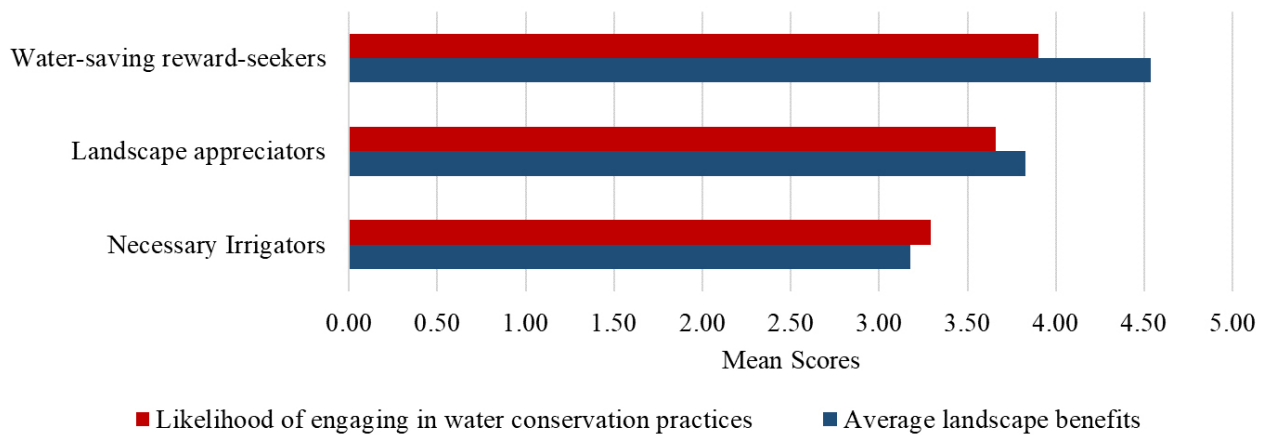


Figure 2. Future engagement in water conservation practices and average perceived benefits by subgroup.

The water-saving reward-seekers had the highest average perceived benefit indicating they valued all landscape benefits the most as compared to the landscape appreciators and the necessary irrigators. Those in this group were most likely to engage in water conservation practices in the future. The landscape appreciators had a moderate/average perceived benefit, indicating they valued all landscape benefits, but not as highly as the water-saving reward-seekers group or as low as the necessary irrigators group. Those in this group were somewhat likely to engage in water conservation practices in the future. The necessary irrigators had the lowest average perceived benefit indicating that they valued all landscape benefits the least as compared to the water-saving reward-seekers or the landscape appreciators. Those in this group were least likely to engage in water conservation practices in the future.

## How to Use This Information

An understanding of the different subgroups existing within this important target audience can contribute to well-tailored Extension programs and desired long-term behavior change. Depending on the local context and specific water issues, Extension professionals should consider developing different strategies for the different subgroups.

Given the characteristics of the group, a water conservation education profile targeting the necessary irrigators subgroup should focus on conveying basic water saving practices (e.g., adjusting timed irrigation appropriately or growing low water-consuming plants). Social marketing tools such as social diffusion could be used to foster positive behavior change. Social diffusion is the spread of ideas with trusted people (e.g., friends, family) who have influence over a person's behavior. Therefore, encouraging conservation among peer groups, neighbors, and community group practices can help diffuse information,

for example, about best irrigation practices. Because the water-saving reward-seekers are heavily engaged in water conservation practices, they can be recruited to participate in this process. The necessary irrigators should be presented with basic conservation strategies since they are least engaged in water conservation.

For the landscape appreciators subgroup, social incentives can be used to stimulate moderately complex water conservation behaviors. For example, a person in this group can qualify for a discount if their landscape promoted at least one landscape benefit while consuming no more than a certain amount of water.

A program designed for the water-saving reward-seekers should focus on continuing existing water conservation practices while promoting new best management practices. Social marketing tools such as prompts and commitments can be applied to uphold existing positive acts of water conservation. Prompts are visual or auditory aids that act as reminders to carry out some behavior. Therefore, it is most appropriate for encouraging positive behaviors by providing reminder cues. Commitments are useful when promoting adoption of a desired behavior. A person is more likely to perform a desired behavior when asked to make some commitment or public pledge. Combined, both tools are useful to remind water-saving reward-seekers to continue saving water and to commit to other water-saving practices they might not currently be engaged in. Such water-saving practices can include complex practices since this group is already highly engaged in water conservation. For example, this group might be challenged to adopt smart irrigation technologies (Dukes & Haman, 2017) or pledge to use less than a specified amount of water per household per day.

## Conclusions

In summary, there are distinct differences (based on subgroup) in the choice of technique and design that may be used to encourage water conservation. The main idea behind this information is to establish well-designed water conservation Extension programs. The important steps to note in how to use this information are:

- Given the characteristics of each group, determine which group Extension clients might fall into.
- Determine which educational approach is best suited to promote water conservation behaviors based on clients' current water saving practices. Consider using social marketing techniques to promote behavior change when appropriate. Those who already conserve might require reminders as opposed to educational material.
- Consider promoting landscape benefits to clients as a way to encourage water conservation. For example, Extension professionals can inform clients that shade trees require less water and helps reduce energy costs because of the cooling benefits they provide.

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