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O 37. PLANT SELECTIONS FOR EDIBLE GARDENS AND URBAN AGRICULTURE IN XERISCAPE LANDSCAPING

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ABSTRACT: Due to the current climate crisis, water has become more important than ever before. Drought and the difficulty of accessing clean water have brought to light applications that reduce water consumption. Xeriscape applications are one of the applications that have begun to take their place among landscape architecture studies in this sense. In applications carried out with the xeriscape landscaping concept, plants with low water consumption are used, soil surfaces are covered with mulch applications as much as possible, and ground covers with high water consumption, such as grass, are avoided. These designs reduce water consumption, create spaces with aesthetic value, and enable the emergence of biomass that stores CO2 against the global climate crisis. The first question of the study is to investigate whether the mentioned Xeriscape applications can be used for purposes other than the mentioned benefits. For this purpose, the usability of urban agricultural practices and edible garden practices that came from the past to the present to maintain the productivity obtained from urban soil surfaces in water-limited applications, that is, xeriscape applications, was investigated. With this approach, the selection of plants that can be used as foodstuffs and the use of selected plants with the xeriscape approach were examined.

Keywords: Edible Gardens, Urban Agriculture, Xeriscape, Landscape Architecture

1. INTRODUCTION

The post-World War II industrial revolution, brought about many technological breakthroughs and launched the era of consumer society. With the increased access of human beings to technological tools to sustain their lives by traditional methods, the level of demand for energy has increased and doubled with a high momentum. On the other hand, developments in health care have led to an increase in the human population, which is due to the prolongation of life expectancy while diseases are cured. The high population, the increasing demand for energy, the rapid depletion of natural resources over the potential for regeneration, led to certain constraints. The most important of these reductions is undoubtedly the reduction in freshwater resources and access to clean water. Due to the current climate crisis, water has become more important than ever before. Today humanity is facing with water scarcity.

Water scarcity can mean scarcity in availability due to physical shortage, or scarcity in access due to the failure of institutions to ensure a regular supply or due to a lack of adequate infrastructure (UNWater, 2018). Drought and the difficulty of accessing clean water have brought to light applications that reduce water consumption. Xeriscape applications are one of the applications that have begun to take their place among landscape architecture studies in this sense. Water scarcity and the fear of drought, on the other hand, have raised concerns that precious land surfaces cannot be evaluated efficiently and that food shortages may arise. To this end, landscape applications, where efficiency is central, have begun to range from home gardens to city-wide park applications. In this context, attention has begun to be drawn to urban agriculture practices, where socio-economic activities are at the forefront. Another form of urban tasting practices are small-scale edible gardens. Edible gardens are gardens where traditional agricultural activities involve production for food purposes, highlighting both the aesthetic and the functional beauty of landscape areas.

This study explored the possibilities of integrating xeriscape landscape applications, one of the applications of landscaping architecture, with edible gardening applications, which put water saving at the forefront. The two different concepts included in the landscape studies are to be evaluated together to create sustainable landscapes that support water-saving economics and ecology while increasing efficiency in landscape areas. The study investigated the concepts of dry landscape and edible gardens, highlighted the advantages and disadvantages of both applications, questioned the integration of applications with each other, and suggested plant species that could be used in this regard. The study

predicts water constraints due to the hot climatic conditions within the Mediterranean climate zone. On the other hand, when we evaluate the data obtained, we have reached the conclusion that there are similar practices in the world, and in our country, these two concepts are used in combination; the studies have not yet been included in the literature.

2.XERISACPE AND EDIBLE GARDEN CONCEPTS

2.1 What is the Xeriscape?

Xeriscaping is a landscaping which reduce or eliminate the need for irrigation. This means xeriscaped landscapes need little or no water, and it is an alternative source to landscaping in water scare areas (Nirmala and Joythi, 2022). The word xeriscape was first used in the US state of Colorado in 1978 (Çorbacı et al. 2017).

Xeriscape landscaping, often known as xeriscaping, refers to a landscaping approach that is specifically tailored for regions prone to drought or homes that prioritise water conservation. The term "xeriscape" originates from the Greek word "xeros," which translates to "dry," and refers to a landscape characterised by its dry conditions. In essence, xeriscape landscaping is a form of horticulture that relies on a limited water supply for optimal growth and sustainability. Xeriscaping, originally developed for hot and arid areas, has seen significant advancements to extend its applicability to various climate types, particularly those facing water scarcity concerns. Furthermore, xeriscaping techniques are frequently incorporated into landscape designs with comparable aesthetic considerations as conventional gardens (Beaulieu, 2023). They are also, beautiful gardens as seen at the figure 1 as an example of an xeriscaped yard.

The arid landscaping style/xeriscape has seven principles that enable more efficient use of water and save time and money. These basic principles and their explanations are given below:

1. Planning and projecting
2. Soil preparation
3. Appropriate plant selection
4. Creation of grass areas
5. Effective irrigation
6. Use of mulch
7. Proper care (Çorbacı et al. 2017).

The significance of land surveys becomes increasingly pronounced at first by planning and projecting.

(a) The natural data includes information on topography, climate (including cold or hot areas), vegetation (in the east, west, north, and south), areas with varying levels of sunlight exposure, areas with water drainage, soil characteristics, and the current state of vegetation (including its health, naturalness, and suitability to the site conditions).

(b) The cultural data encompasses the identification of functional areas such as land use, hard surfaces, pedestrian pathways, vehicular roads, pools, and other relevant features. Additionally, it involves assessing the visual quality of the area, distinguishing between favourable and unfavourable appearances (Çınar and Kart Aktaş, 2018).

Figure 1. A xeriscaped yard in Niwot designed by J&S Landscape. Photo courtesy of J&S Landscape.: (Ufheil and Hunt, 2019)

Prior to implementing xeriscape applications on the yards, it is imperative to do soil studies and preparation, as well as complete the necessary plant selection, as part of the planning and design process. The use of lawn applications should be restricted and should consist of low-water demand grass varieties that are capable of withstanding arid conditions and are compatible with the capacity of the chosen irrigation system. The utilisation of mulch is of great significance in xeriscape applications due to its potential to mitigate evaporation and minimise water loss. Additionally, the establishment of a maintenance programme is essential to ensure the long-term viability of a xeriscape garden.

The benefits of xeriscape landscaping applications can be listed under 10 headings (Simth, 2022).

1. **Conserves water:** Turfgrass requires significantly more water than native plants, many of which may survive without further irrigation. Moreover, hydro zoning lessens overwatering and underwatering by classifying plants according to their water requirements.
2. **Saves money:** You can save up to 80% on your water bills with xeriscaping. Xeriscaping can save you a staggering 87% of your annual lawn care expenses.
3. **Gives you access to financial incentives**: In the USA and Europe, a lot of municipal governments provide homes that want to xeriscape with rebates and reduced bills.
4. **Attracts future buyers:** Xeriscaping is becoming more and more popular as a more environmentally friendly form of landscaping, and it can raise the value of your home by 14%.

Figure 2. A xeriscaped home environment example (Yazzie,2023)

5. Saves time: Once established, some hardy native plants don't require any watering at all. Other drought-tolerant plants include perennial flowers, succulents, shrubs, trees, and ground coverings. Watering these plants should be done seldom, usually once every two to three weeks.

6. Promotes biodiversity: Your xeriscape may provide the home and food supply that many native animals and insects need while their natural habitats are being lost. Beautiful pollinators like birds, bees, and butterflies are drawn to native plants, so your backyard will soon be a vibrant spectacle.

7. Extends the life of water resources infrastructure: Reducing water usage contributes to the preservation of aquifers, water treatment facilities, and reservoirs.

8. Reduces or eliminates chemical needs: Because native plants utilized in xeriscapes are specifically suited to your area, you won't need to use dangerous pesticides or fertilizers.

9. Decreases energy use and pollution: With conserving energy, xeriscaping helps your watershed remain cleaner, consume fewer fossil fuels, and save more water for later.

10. Gorgeous and fun to gardening: It may be enjoyable and fulfilling to plant a rock garden, create a wildflower-filled haven with a chair or seat for reading, or construct an edged patio. You never know, your neighbours could be motivated to follow your lead (Simth, 2022).

2.2. Edible Garden

According to Bhatt's study conducted in 2009, edible landscaping exhibits no discernible distinction from conventional landscaping, as it adheres to the same rules and principles during the planning phase.

The design of an edible landscape can rely on it as a sustainable and multipurpose project, while also considering community development programmes, designing schemes, and housing type and design. İt is the practise of utilising fruits, vegetables, herbs, and flowers in a manner that extends beyond their aesthetic qualities, encompassing their utility as sources of sustenance, flavour, and visual allure, is commonly referred to as edible landscaping. Edible landscaping presents itself as a viable alternative to conventional landscapes that are primarily dedicated to the cultivation of fruits, vegetables, and herbs for personal consumption. Edible plants have the potential to be cultivated independently or integrated with ornamental species, resulting in aesthetically pleasing arrangements inside preexisting gardens and yards (Fetouh, 2018).

Figure 3. Edible Garden Project in University of Minnesota (Greytak et Al. 2019)

The edible garden serves several purposes. These functions, such as production, economic revitalization, energy and waste management, biodiversity support, community socialisation, sociality, public health, cultural heritage, education, and so on, are easily collected (Table 1).

Table 1. The purpose and accompanying practises of edible landscaping according to Fetouh, (2018).

FUNCTION	DESCRIPTION AND JUSTIFICATION	SUPPORTIVE PLANNING STRATEGIES
Production	The noncommercial production of food categories inside local communities. Edible landscaping refers to the practise of incorporating food-producing plants into the design and layout of landscapes.	Planning landscapes for sustainable production and resources use efficiency
Energy management	Local food production conserve power consumed during packing, cooling and transportation	Develop transportation systems for efficient food delivering system
Waste management	Recycling organic wastes for compost production and safety food fertilizing	Develop waste collection and composting system for local communities
Biodiversity	Landscape planning can support a various collection of native and imported plant species	Reshaping the distribution of landscape items to add more gardens and farms
Microclimate control	Landscape usually positively modify microclimate through humidity control, wind protection, and shade	Designing edible landscape to allow air movement to avoid climate worming conditions
Economic revitalization	Edible ornamentals offer more jobs in the low-income neighbourhoods	Develop social network to introduce residents to new jobs
Community socialization	Gardening activity and sharing food products enhance socialization among residents	Integration of farming activity along with other social activity
Public health	Free access for fresh fruits and vegetables plus other green spaces usually enhance resident's health and physical activity	Explore opportunities to develop healthy lifestyle through community programming

Cultural heritage	Edible ornamentals can provide access to typical ethnic food that can be very rare for immigrant residents	Providing communities with immigrant population with community edible landscaping
Education	Edible landscaping enables kids and adult to know about food production, crops, nutrition, environment and other cultures	Organizing programs during summer and vacations for gardening activity

3. EDIBLE GARDEN CONCEPTS FOR XERISCAPE

Edible garden designs for drought areas or xeric landscaping can be designed by taking into account three different concepts.

3.1. Mediterranean Gardens

The vegetative texture of the Mediterranean and its environs is used in this design style, as well as edible herbaceous and woody species, trees and bushes whose fruits or leaves can be eaten or drunk.

Plants that can be used in this garden design style include, olives, figs, pomegranates, oriental persimmon, citrus, grapes, rosemary, oregano, basil, and shrubs strawberry, chamomile, red raspberry, blackberry (Popenoe, 2023)

Figure 4. Olive Tree (Doğa Dergisi, 2020)

3.2. Edible Succulents used Gardens.

Edible cactus and succulents, which are essential for xeriscape gardening, are chosen and employed in landscaping areas in this design style.

Cacti and succulents that can be used in this design approach include: Opuntia Cactus, Dragon Fruit. Portulacaria afre, Purslane, Yucca flovers, Aloe (Lee Baldwin, 2020).


Figure 5 and 6. Opuntia catus (Anonym, 2023a) and Dragon Fruit (Anonym, 2023b)

3.3. Drought Tolerant Herbs and Vegetables used Gardens.

In this type of design, the design is carried out by taking into account only the drought resistance capacities of the edible plants to be used, without considering any style or region. The primary purpose of this design can be considered as production.

Plants that can be used in this garden design style are.

- **Herbs:** Bee balm, Lavender, Marjoram, Yarrow, Sweet alyssum, Oregano, Thyme, Rosemary, Russian sage, Lamb's ears (Tilley, 2023).


Figure 7. Oregano and Thyme (Anonym, 2023c)

- **Vegetables:** Onions, Broccoli, Cabbage, Spinach, Radish, Beets, Leaf lettuce (Tilley, 2023).


Figure 8. Broccoli (Anonym, 2023d.) and radish (Anonym, 2023e)

4. CONCLUSION

Creating edible gardens for drought-resistant or xeriscape gardens is a very important and precious approach that we can use to produce food under water scarcity conditions in the future. And every fertile square will be important for communal food consumption in the near future because of uncontrolled urban growth.

With this approach, every centimetre of clean soil must be productive in many ways. This study offers a different perspective for drought areas using edible plants while xeriscaping. At the end, using soil from a productive perspective will be more important in the near future, given the global climate crisis.

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