Xeriscaping and Assessment of Applications in Turkey

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Abstract:

Today, the negative effects caused by human beings such as; rapid population growth and industrialization, non-planned urbanization, misuse of land and deterioration of the natural structure, increasing greenhouse gases released into the atmosphere and deforestation, climate change and global warming, gained an irreversible new dimension. With all the concerns caused by these negative effects, new planning and design principles come up according to research related to efficient and effective use of the natural resources. With this purpose, Xeriscape, generated in 1980’s, is an approach targeting effective use of water which is natural and scarce. Xeriscape consists of seven stages which are planning and design, soil analysis and soil preparation, lawn establishment, plant selection, efficient water system design, implementation of mulch and maintenance. The aim of this study is to explain seven stages of Xeriscape planning system with detailed examples in Turkey and to ensure exchange of information.

Key words: Xeriscape, planning, design, implementation.

Introduction:

In this century, as a result of population growth, industrialization, un-planned urbanization, misuse of land and also climate change and global warming events, degradation of natural structure has been irreversibly accelerated. With all these negative effects which are listed with this concern, efficient and effective use of natural resources has been aimed in the landscape planning, while up to date planning and design principles are being generated. Rational and efficient use, as a result of global warming, is a vital importance for green spaces as well as for all organisms. As a result of these approaches such as rational and efficient use of water, less use of water and xeriscaping sense have emerged, instead of conventional classic landscaping for water saving in landscape and design studies.

In 1981, the waterwork department in the city of Denver has implemented one of the first serious measures which are taken in the world. This prevention of water-saving use in landscapes in the city formed ‘xeros’ which means ‘dry’ in Greek and in English word ‘landscape’ than called ‘xeriscape’. Xeriscape approach contains protecting environment and landscape implementations which uses water efficiently and minimizes the use of water (Barış 2007).

Xeriscape approach is based on the landscape techniques which are in harmony with the nature, in arid climate areas and the areas which have limited water resources.

Material and Method:

In this study; the reasons of xeriscape sense, motives under its emergence, main principles of xeriscaping and some examples were examined. Then, particularly in Istanbul and its surrounding, some landscaping studies of various private and public organization’s implementations were examined.

In the study; Barış (2007), Yazgan and Özyavuz (2008), Ertop (2009) and Çakıroğlu (2011) were mainly used as references. Also as a case study various internet resources investigated from the world. Then, In Istanbul Metropolitan Municipality Department of Parks and Gardens Directorate, District for Highways and private company studies were defined with mutual interview and observations.

Basic Principles of Xeriscaping:

Xeriscaping has seven basic principles which are planning and design, soil conditions reclamation, drought-tolerant plant species selection, reducing lawn areas, efficient irrigation, use of mulches and performing the appropriate maintenance.
-Planning and Design:

It is the first and the most important step. Natural and cultural characteristics of the area which is subject to landscaping should be analysed carefully. Current land use format, existing vegetation, climate conditions, topographical features, soil features, sunny and shaded areas, drainage conditions, etc. should be carefully evaluated. Then, landscape projects, which minimize the use of water and bring the rainwater to the soil, should be prepared.

-Rehabilitation of Soil Conditions:

First of all, the soil analysis is needed and depending on this need, improving studies should be done. Determination of properties like pH-value of soil, the level of plant nutrients, with contents of sand, stone, clay, organic matter, water holding capacity and rehabilitation works should be done.

-Selection of drought-tolerant plant species:
First of all, identification of natural species and their use should be elaborated. Because these plants are more durable species, require less maintenance and adopted to the ecological conditions for centuries. Also use of species which have less water requirements should be prioritized. The use of natural plant species would also provide benefits such as improving the quality of environment, biodiversity conservation, and creating habitats for wildlife.

-Reducing lawn areas:

Lawn areas require much more care and water. Therefore, except mandatory functional use areas (playgrounds, recreational areas, etc.), they should be disused or their usage should be reduced. If their use is necessary, drought grass should be established or low shrubs and groundcover plants which need less water should be evaluated.

-Efficient irrigation:

Newly established green areas, features such as usage, size, etc. should be considered a new irrigation system. If we use the species in groups that require some quality of water as generating an irrigation system, efficient water use will occur. Use of moisture sensor will contribute water saving, while establishing a water system. Also, collection of rain and snow water operations such as using water treatment for plant watering should be considered for water conservation.

-Use of mulch:

The main purpose of mulching, which provides the appropriate temperature and moisture conditions around the roots, reduces evaporation in this way by keeping more water in the soil and providing use of water by the plants. Also preventing the weed formation will contribute to the plant while using water. Mulch layer shouldn’t be so thick, it shouldn’t be in contact with the trunk directly and organic mulch should be used (bark, chop, plant particles etc.). Especially by the use of inorganic mulch around the plant, light coloured one should be preferred (Figure 1).

Figure 1. Mulch implementation of urban green spaces in Chicago

-Implementation of appropriate care:

Regular and proper maintenance, pruning, fertilizing, weeding, irrigation, etc. will provide good development, health and less water use for plants. For this purpose, the use of organic fertilizers also doing biological control of pests and disease will contribute the protection of water resources (Figure 2).
Results:

Some landscaping implemented by public and private organizations in Istanbul and its surrounding, which specified material and method section were examined according to xeriscaping principles and following determinations were made.

- Projects which aim efficient use of water haven’t been fully implemented in planning and design stages yet. In landscape projects designs only aim aesthetics, particularly by the plant use.

- Improving soil conditions are considered as important especially for seasonal flowers, lawn areas and groundcover plants. Enough attention isn’t shown for tree and shrub planting.

- The issues of selection of drought-tolerent plants and particularly use of natural plant species haven’t been considered decently. Tree and shrub species which are mainly imported or produced are used in our country. But their water requirement hasn’t been taken into consideration.

- Lawn areas are quite widely used in private gardens like urban recreational areas, highway slopes, coastal parks, as an alternative plant species while groundcover plant, tree and shrub use are ignored.

In recent years, although the increase of using automatic irrigation system, irrigation with tankers and irrigation with using city water are stil going on in our country (Figure 3). Collection of rain and snow water and using it for irrigation haven’t been perfomed.

- The use of mulch hasn’t become widespread yet, often considered mostly for private gardens for aesthetic solutions.

- In recent years, maintenance works especially in areas which are under the responsibility of public authorities have become noticeable. However, the right approach would be to do the appropriate maintenance works which are releated with these six principles.

Discussion:

As the examples in terms of xeriscaping from developed countries and various states especially from the USA are analyzed:
The concept of xeriscaping and its implementation principles in public green spaces are defined with the laws.

- Mulching is used especially beneath the plant groups.
- Lawn areas should be reduced, drought-resistant plants such as tree, shrub, groundcover, etc. which are natural and need less water can be used.
- Ponds which accumulate rain and snow water are established. These ponds create an environment for wildlife and they are used for plant implementation.
- Even in private gardens natural plant use and xeriscaping are common.
- Drought-tolerant grass species are used, while creating lawn areas.
- Soil conditions are improved, before the planting. Species which require less water, not grow too high and not constitute very wide canopy are used.
- Spaces nearby the sidewalks have been created. Thus, surface water flow from the streets to the green spaces got easier.
- Water restriction degrees are implemented and legislated.
- In summer months lawn areas aren’t created and short mown is not seen.

All these determinations show that, xeriscaping is an approach which contains protection of the environment, prescriptive of efficient and less use of water and has a landscape technique, which is harmony with nature. Instead of the usual classical landscape assessment techniques and implementations, adopting a sense of xeriscape is a vital necessity.

In landscape planning, design and implementation studies which will be held in our country;

- Primary aim should be water conservation and efficient use of water.
- Xeriscaping principles and regulations should be used in planning and implementation processes. This should be the legal requirement.
- For each province plant lists should be made up which is appropriate in xeriscaping sense. For nurseries producing these plants and for private and public establishments use of these type of plants should be mandatory.

References