

Xeriscaping: Water-Wise Landscaping

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Introduction

Water constitutes 70 % of the Earth surface with 2.5 % fresh water of which 1.2 % is available as surface freshwater. Saving water for human needs is more important in the present scenario of burgeoning population. Efficient water management system that stimulates the natural hydrological cycle is one of the key elements for sustainable landscape design. Thus, xeriscaping would be a better choice to conserve water and enhancing the aesthetic value of the landscape. Xeriscape is derived from the greek word 'Xeros' meaning 'dry' and was coined by Denver Water in 1981. It is the sustainable approach for landscaping dry areas where water conservation is practiced. It assures water and energy savings, biodiversity conservation, soil health, reduced labour cost, minimal chemical usage and enhanced visual quality. According to a research, it was proved that xeriscaping saved 55.80 gallons of water per sq.ft per year compared to traditional landscaping.

Xeriscaping styles

- **Desert or South West style:** This style signifies the dry arid regions of the west which are known for its native American and Spanish details. It contains native plants and integrates with the bright, vibrant and colourful building materials. Terracotta textiles, natural stones, wood, pebbles, decomposed granite, red clay pavers, plaster wall and patios, terracing and colourful native plants are the elements of this type.
- **Mediterranean or Tuscan style:** This garden is stimulated by the coastal areas of Spain, Italy and France. It combines the calm resources and plants using prescribed accents and designs. Terracotta pots, gravels, pots, water feature, potted plants, boxed hedgerows, Mediterranean plant pallet and stone work including walls and pathways are the elements employed in this garden.
- **Japanese or Zen-garden:** This garden symbolizes natural elements and mimics the nature. It is considered for peaceful meditation. Its elements are artificial rocks, plants, ornamentations, use of geometry spaces and lantern lamps (Example: Japanese garden at Chandigarh).

Important factors for xeriscaping

❖ Water-wise planning and designing

Before planning a xeriscape design, a base map should be made with respect to the building structure, driveway, actual vegetation, wind direction, water availability and positioning of sun. The site should be analysed for existing elements and water use zones should be established. Water use zones are generally referred as the 'hydrazones' which means zoning or dividing area based on the availability of water. It can be of very low, low, moderate and high water use areas based on which the plants requiring different water levels can be allocated. Planning involves the selection of plants, hardscapes, irrigation system and grouping of plants based on the factors identified during site analysis.

❖ Soil improvement

The soil should be checked before planning as it plays a major role in supplementing the plant's water requirement as well as to conserve water by avoiding seepage or water loss. Silt soil may be the better option for xeriscape which grants water holding capacity and good drainage. If silt soil is not available, soil amendments with organic manure or native soil can be done to improve the soil physical and chemical properties thus making it amenable for xeriscaping.

❖ Selection of appropriate plants

Plants should be selected based on the area, environment, microclimate, functional use, colour, texture, growth rate, drought tolerance and personal preference. Clustering plants with similar water needs and care reduces the maintenance cost and saves energy as well. For example, plants requiring high light levels and tolerating drought like dianthus, silver mound and day lilies can be grouped together. Also, plants which need little dampness like irises, baby's smell and roses can be clustered.

- **Ground covers:** *Ajuga reptans*, *Hedera helix*, *Juniperus spp.*, *Liriope muscari*, *Ophiopogon japonicas*, *Pachysandra procumbens*, *Portulaca grandiflora*, *Rosmarinus officinalis*, *Santolina spp.*, *Trachelospermum asiaticum*, *T. jasminoides*, *Wedelia spp.*
- **Annuals and shrubs:** *Achillea biebersteinii*, *Aeonium arboretum*, *Agapanthus orientalis*, *Althaea rosea*, *Althaea setosa*, *Anemone coronaria*,

Artemisia spp., *Baptisia australis*, *Berberis thunbergii*, *Bougainvillea spectabilis*, *Campsis radicans*, *Chrysanthemum coronarium*, *Dombeya wallichii*, *Eerigeron karvinskianus*, *Eleagnus angustifolia*, *Elymus arenarius*, *Erodium gruinum*, *Eupatorium maculatum*, *Euphorbia macroclada*, *Gaillardia*, *Galphimia glauca*, *Herperaloe parviflora*, *Iberis sempervirens*, *Iris*, *Lavandula* spp., *Muscari commutatum*, *Nerium oleander*, *Ononis natrix*, *Pelargonium domesticum*, *Penstemon digitalis*, *Perovskia atriplicifolia*, *Phlox subulata*, *Plumbago auriculata*, *Raphiolepis indica*, *Rosa chinensis*, *Rosa odorata*, *Rudbeckia maxima*, *Salvia* spp., *Saxifraga x arendsii*, *Syringa vulgaris*, *Thymus* spp., *Zephyranthes candida*

- **Trees and palms:** *Acacia cyanophylla*, *Albizia lebeck*, *Bismarckia nobilis*, *Brachychiton populneus*, *Casuarina equisetifolia*, *Celtis occidentalis*, *Cersis siliquastrum*, *Cupressus arizonica*, *C. sempervirens*, *Dypsis lutescens*, *Koelreuteria paniculata*, *Lagestroemia indiana*, *Lonicera fragrantissima*, *Nandina domestica*, *Pinus elliotii*, *Quercus virginiana*, *Washingtonia filifera*
- **Grasses:** *Axonopus officinis*, *Buchloe dactyloides*, *Bouteloua gracilis*, *Cynodon dactylon*, *Eragrostis spectabilis*, *Eremochloa ophiuroides*, *Festuca arundinaceae*, *Schizachyrium scoparium*, *Sporobolus heterolepis*, *Stenotaphrum secundatum*, *Zoysia*
- **Cactus and Succulents:** *Aloe aristata*, *Bryophyllum*, *Euphorbia milli*, *E. myrsinites*, *E. stenoclada*, *Furcraea foetida*, *Haworthia venosa*, *Hylocereus undatus*, *Iresine herbstii aureoreticulata*, *Kalanchoe tomentosa*, *Mammillaria balmi*, *Notocactus leninghausii*, *Opuntia microdasys*, *Pachyphytum oveiferum*, *Pachypodium densiflorum*, *Pedilanthus tithymaloides*, *Pereskia corrugate*, *Sansevieria trifasciata*, *Sedum* spp., *Sempervivum tectorum*, *Senecio radicans*, *Stephania* spp., *Yucca filimentonsa*

❖ Creating practical turf grass areas

Turf grasses are 30° F cooler than concrete floor and 10-14° F cooler than bare soil. Cooling effect of the lawn is almost equal to 8 tons of air conditioning. It adsorbs dust and other air pollutants and release oxygen. Though lawn has several advantages to create microclimate, the turf grasses require tremendous water for their growth, survival and aesthetic appeal. Thus, instead of planning lawn for a large area, it can be restricted to areas like children playing area, pet area or as focal point in shaded areas or flat grounds. It can also be designed in patterns in alternate with gravel, pebbles or stones. The turf grasses should be

deep-rooted and drought tolerant with good tillering capacity. Some turf grass varieties suitable for xeriscaping are Tifway Bermuda, Common Bermuda, Raleigh St. Augustine, Rebel 11 Tall fescue, Centipede grass, Meyer Zoysia and K 31 Tall Fescue.

❖ Efficient irrigation

Watering should be done judiciously based on the grouping which is done based on the plant's requirements. Hydrogels can be used which has good water holding capacity preventing evaporation, seepage and percolation of excess water after saturation. One pound of crystals per 100 sq. ft holds 20-25 gallons of water and can last for 6 months to several years in soil. Irrigation can be scheduled between 9 p.m and 9 a.m so as to reduce the loss due to evaporation. Deep and infrequent watering can be followed to induce deep root system in plants. Drip irrigation can be used to minimize evaporation and deliver water to root zone. Water conservation tools like thumb-controlled hose nozzle, wind-resistant sprinkler, super duty hose together with electronic water timer and rain barrel can be installed. Supplementation of water based on the hydrazones is given in the table below.

Hydrazone	Water requirement	Plant type examples
Very low	During plant establishment	Most native plants
Low	During some growing seasons	Most perennial, some trees and shrubs
Moderate	Regular amount during growing period	Fruit trees, ornamental trees, shrubs
High	Regular amount during growing period	Turf grass and vegetable gardens

❖ Mulching

Mulching controls the direct water loss from soil as well as indirectly reduce plant water requirement by creating a microclimate near root zone. Organic mulches, fibre mulches and inorganic mulches can be used. Organic mulches like saw dust, rice husk, bark shreds, etc, can be laid to 2-4 inches deep. Fibre mulches have the capacity to resist wind and rain washout by creating web. Inorganic mulches for 2-3 inches deep can be used for turf or low-water plants. The use of rocks around plants can be avoided as rocks build up heat and increases water need.

❖ Proper maintenance

Aeration and de-thatching should be practiced to improve infiltration and reduce runoff in lawn.

Weeding should be done as the weeds take up the valuable water and fertilizer. Trees, shrubs and perennials should be pruned occasionally leaving the branches low to ground. The removed plant materials can be shredded and used in compost piles.

❖ Water conserving techniques

As water is considered as the most important factor and heart of the xeriscape, various ways to conserve water should be employed. Reducing area under irrigation, using hardscapes, grouping of plants by water need, replacing potable water with recycled or low-quality ground water unfit for human consumption, using efficient irrigation systems and native plants can be adopted.

Conclusion: Landscaping is very crucial part of metropolitan areas where lack of greenery leads to pollution and soil erosion. Existing landscape needs more water, high maintenance, seasonal changes and regular fertilizer application. Xeriscaping will be the better solution to tackle both these situations and promote sustainability. Xeriscape is one of the most important landscape practices most suitable for dry region of India. There is a greater scope for deploying native plants in xeriscape owing to their suitability and advantages. Adopting advanced irrigation technologies and the use of recycled water reduce the wastage of potable water and definitely maximize the utility of water to human needs.

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