
UNIT 3 ROCK GARDEN, WATER GARDEN AND INDOOR GARDEN

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3.0 OBJECTIVES

After going through this unit, you will be in position to:

- study about Rock-garden, Water garden and Indoor gardens,
- learn how to develop Rock garden, Water garden and Indoor garden,
- study about different structures of Rock-garden, Water garden and Indoor garden,
- learn use of soil media in these gardens beds,
- study different type of materials used to develop Rock garden, Water garden and Indoor garden,
- learn about different type of plants and bushes used to develop Rock garden Water garden and Indoor garden, and
- Study flowering plants for Rock garden, Water garden and Indoor garden.

3.1 INTRODUCTION

Rock-garden and water gardens are very attractive features of landscape gardening and indoor gardens are inside landscaping of a house. The Rock- gardens are developed with the help of different type of rocks and stones with different ornamental plants, water garden is develop in open with the help of water pond and different type of water plants, while indoor gardens are developed with the help of foliage plants, climbers plants, flowering plants and cacti and succulents inside the house. To develop rock garden and water garden we have to raise different type of structure to make these garden attractive. All the features of these gardens project an attractive landscaping.

In rock garden, we can create a cool or cheerful effects by using of different type of stones in combination with plants. For instance, a Rock garden made with red and yellow sandstone and scarves covered with the bright green leaves and grey flowers of the Saxifrage family would be a warming sight on a sunny day in spring. If we are setting a greyish sandstone in large slaps and interplanting it with dark green conifers and evergreen shrubs, a distinctly sombre scene would be created.

3.2 DEVELOPMENT OF ROCK GARDEN, WATER GARDEN AND INDOOR GARDEN

These gardens are very important parts of landscape gardening. Every garden have different features and structures which we will discuss individually for each type of garden.

3.2.1 Rock Garden

You have seen ornamental plants growing on rock. This is known as rock-garden or rock landscaping. Rock garden generally developed with the help of rock and different type of ornamental plants to make them attractive.

3.2.1.1 What is a Rock Garden ?

When a garden is developed on rock or with the help of different type of natural rocks and beautiful ornamental plants of different types, is known as “Rock-garden”. Like other gardens features, Rock-garden is also consist of different type of features which make it attractive.

3.2.1.2 Different Type of Rocks and Stones used for Rock Garden

To develop a Rock garden we used different type of stones or rocks and ornamental plants material to make it attractive. These stones may be natural, artificial or wasted one. The stones are of different type, shape and structure. Some of them are described below one by one:

- i) **Limestones** : These stones are often favoured for Rock-garden and these have different type of colour. Some are gray, other yellow or brown, just as sandstone may be anything from yellow to red or green. Kentish rag from the lower green sand beds have good colour. It show varying degree or stratification, which makes them easy to layout.
- ii) **Port Land Stone** : It is fit to develop good look. In it quite a seasonable colour can be developed by staining cement with a solution of iron sulphate and by making your own rocks. In this case you can any develop shape and size by making your own mould.
- iii) **Sandstones** : These stones show varying degrees of form, which make them easy to layout. Generally, in designing rock gardens, the rock are laid as though they formed part of a natural outcrop, and this is good system to follow.
- iv) **Tufa** : Tufa which weathers to a dark grey and is a soft absorbent rock like punic stone. It can be replaced by “hypertufa”. It is a good home for plants like the mossy saxifrages, but it is expensive. A substitute may be made by mixing two parts peat, with one part each of sand and cement (all by bulk). Mixed this material properly before water is added. It is usually best to mix the water in until a thick cream cement is formed. A special mould is prepared by digging large holes in the garden soil and lining them with large rock or stones. Now the thick cream cement which you have prepared, should be poured into these large holes made in garden. This is your “hypertufa” stone developed by you self. When this “hipertufa” has dried the other stones may be knocked out easily with a hammer or left. Pockets for plants can be cut with a chisel. When the mixture of cement is prepared for mould, Cement colorants can be mixed, in it when making the ‘hypertufa, to look attractive in different colour to use in Rock garden.
- v) **Granite Stone** : It was used in the Victorian era, for rock-gardens. Although it is expensive, its crystalline qualities make it attractive. It again become popular with changing fashions in design.

- vi) **Local Rock** : In the ancient time, a lot of nonsense is talked about the importance of obtaining rocks which fit in the garden with local rock. Unless the local rock formations are visible with your garden, this would hardly seem to matter. In this case most important is the fact that if you obtain rock from some longer distance away the piece per ton is likely to be three or four times as high as it would normally be to pay for transporting it. A ton of local stone have more weight and not enough for a small rock garden development while a ton of sandstone would be enough for a small rock garden. Remember that the volume of a ton of local Rock will vary, same volume of some limestones will be twice as heavy as sandstone.

3.2.1.3 Ancient Rock Garden

In former times rock gardens were conceived in the form of structure with running water and Ferny niches. In the early 1900 greater interest started to be shown in simulating the actual conditions of alpine regions to provide suitable conditions for the growth of alpine plants. Your choice will probably reflect your approach: that of a gardener seeking to add another feature to the garden to contrast with the flat lawn or to act as a local points.

3.2.1.4 Setting of Rocks to Develop Rock Garden

Now we will discuss about the setting of rocks for garden development. To develop Rock garden, setting of rocks is a essential and difficult part of garden. It depends on the shape of garden soil where it will be developed. Some methods, how to set the rocks are described below :

- i) **Setting of Rock on Sloping garden land** : If you have a sloping land to develop a rock garden, to set the rocks on such land is not easy, to make a rock garden. The rocks should themselves slop back words so that the rain falling on them runs back into the ground and not down the hill. The main reason for the slop in a rock-garden is to develop the extra drainage needed by many rock plants, and this can be obtained without either rock or a scope by making a raised bed, using concrete slabe. If you have a garden sloping towards the south you have the ideal site.



Setting of Stones for Rock Garden

- ii) **Setting of Rocks on Flat Garden Land :** If you have a flat land to develop Rock-garden, it is easy to set rock of flat land. The easiest procedure to set the rock on flat land is to dig out the hole to make both a mound for the rock garden and a site for a pool at the same time. It is also quite workable to build a rock-garden on the flat with long flat pieces of stone sloping slightly upwards. Interspersed with an occasional tall conifers of the cypress family, a fine horizontal and vertical effect can be obtained in the Rock garden.

3.2.1.5 Planning of Rock setting

Planning of rock setting in the Rock gardens will depend on the shape of rocks and the number available. A large number of flat stones will enable you to set one on top of the other with gaps and space for smaller stones and soil in the style of an outcrop.

If you have smaller number of block-shaped stones, it will be a simple matter to set them out like wall to form small compartmented terraces of soil.

If you are including a pool in the design of Rock garden you may like to incorporate a water course together with a submerged pump, to pump water from a pool on a lower level to one on a higher level. Such system will require an electricity supply to work the pump and main water supply to keep up the level of water lost by evaporation.

3.2.1.6 Development of Terraces on Rock Garden

To build terraces on Rock garden you have the basic requirements for constructing a scree. A scree is a simple pile of broken rocks and soon at the foot of a steep cliff. It is ideal for certain alpine plants which require dry conditions where they meet the soil.

- i) **Soil media for Terraces beds of Rock Garden :** Dig out the beds of Terraces about 1-2 feet of soil and put in a layer of small rocks at the bottom a few inches thick for water drainage. Above this layer lay some fibrous material such as sphagnum peat mass to prevent topsoil penetrating the drainage area, and then cover this with a top layer of chippings, gravels, peat, loam and finally broken down leaf mould. The stone chippings gravels in these beds should form four fifth of the total bulk.

3.2.1.7 Waterfall on Rock Garden

If you are developing a water fall or running water in your rock garden, you can also built a moraine which is simply a pile of stones at the foot of the glacier, on which several fine-flowering plants can survive or grow easily. The moraine is similar to the scree / mud except that the bottom of the excavated area halfway up the side are lined with pudding clay or cement to make an underground lake. An outlet for water is made at the lower end of the lake a few inches above the level of the bottom, and layers laid down as above for the scree/ mud. Water in let in at the upper end of the scope. It is important not to try to grow lime-hatching plants in a moraine or scree made with limestones chippings.

3.2.1.8 Media for Rock Gardens

The soil or media for rock garden is best to made of – four parts loam; two parts humus, two part grit. The best loam is made of properly matured fibrous turves, but for most gardeners purpose it may be thought of a good garden soil with both good drainage and moisture retaining constituents (sand clay). The humus may be provided by peat, compost or leaf-mould. The grit should be sharp (not builder's sands).

On the surface of soil you can use of plenty of loose granite, limestone chippings, form attractive appearance, keep down weeds and help to retain moisture. Chipping should be added to screens and wherever there are poor-soil loving plants.

3.2.1.9 Plantation of Wall Shrubs and Climbers on Different Structure of Rock Gardens

It is a very important part of a rock garden to make it attractive. It is not necessary to plant the rock garden at the same time when it is going to be constructed. This is usually inconvenient. It is better to plants the ornamental plants after the construction work is over. It is better that Rock garden be constructed in the autumn so that spring flowering plants will have time to settle in ready form in the coming season. The plantation scheme for rock garden is given below :

- i) **Construction of dry stone wall and plantation :** In the rock garden, walls for edging or for raised beds or low retaining walls, you can built of large stones or coloured paving slabs and it can form a warm looking feature of any garden. The height of the wall should be about four feet with loos construction, which is held together only by the soil and on which, the roots of plants can grow in it.

It wall is more than four feet high, for extra height a retaining wall can be built with terrace bed forming wide steps. A foundation trench should be excavated to a depth of about 9 inches and filled with rubbles well rammed down and topped with a layer of ashes or soil. In the retaining wall, the stones should be laid titling back slightly so that their weight partly rests against the ground behind. For raised beds two or three feet wide stones can be laid vertically with a step of half an inch or an inch between each layer. Sandstone wall look attractive but you can also use the rough-faced bricks made of stone composition for a low dry wall. Follow the pattern of bonding seen in brickwork as it makes for greater strength and use a soil mixture for the “mortar” of 3- part fibrous loam, 1- part peat and 1- part sand. You will found no difficulty to incorporate any rock plants in it, to plant, as soon as you build the wall. There should be plenty of soil behind the wall and keep it moist.

At the time of plantation, leave some gape for the plants to expand and place for one you would like to add when they become obtainable.

The following plants are suitable to plants on dry stone walls. These plants are – Arabis, Campanula, Alyssum, Dianthus, Gypsophila, Hypericum, Phlox, Subulata, Sedum, Zauschneria californica (Californian fuchsia) and Sempervivum etc.



Rock Garden with Bulbous Flowers



Rock Garden

3.2.1.10 Formation of Peat wall and its Plantation

If in your soil alkaline contents are high a peat-wall of some kind is essential, if you want to grow lime-hating plants. Peat-wall consist of block of peat which are built up like bricks. The blocks are held together with a mixture of 2-part of leaf mould or peat and one part each of lime free loam and sharp sand. The blocks can be built up to form raised beds or rock garden terraces and its maximum height from two feet should not be exceeded. However, terraces built in steps can reach much higher than this.

It is good to adopt a pyramidal method of building by setting back each layer of block from the one below. The terraces or cavities behind the blocks can be filled with a soil mixture similar to the above or add more leaf- mould and peat if desired. In areas where the tap water is chalky the beds must be watered with rain water. Species suitable for such places are included many of those from the following genera.

Arcterifa, Arctospaphylos, Cyclamen, Cassiope, Calluna, Deboecia, Erica, Gentiana, Kalmiopsis, Leucothoii, Laveisia, Ourisia, Phlox, Prymula,

3.2.1.11 Alpine lawns of Rock Garden

Paving plants are often suited to alpine lawns which are simply places where low-growing flowers or creeping plants form a carpet, which may adjoin the rock garden or even form part of it. They may have stepping stones or rocks interspersed through them and the ground may be sloping or flat low-growing bulbs will make colourful sight in spring. These bulbs are- Narsissus bulbocodium, or Crocus, Scilla and Puschkivia etc. For autumn you can use bulbs of crocus, Colchicum and Cyclamen neapolitanum with its marbled foliage and pink flowers. In larger lawn you can grow few bigger flower upto a foot and one or two dwarfish shrubs. Strictly speaking an alpine lawn has no grass and the bulbs. Larger flowers appear through a carpet of low-growing alpine plants.

3.2.1.12 Paved Areas, Paths and Sunken Gardens

Paved area, path or sunken garden are also associated with Rock gardens. These are often home of creeping plants between Crazy paving or paving stones. To develop it, a foundation of rubble is first rammed down which cover with sand. Old bricks, paving stones, precast slabs etc. may be used singly or left with gaps and cracks to accommodate the plants. The places where planting are made should have some suitable sandy - compost. Creeping Jenny (*Chysimachia nummularia* and *Cotoneaster horizontalis*) low growing shrubs, are excellent for larger paved area. Many other rock plants can grow under these conditions.

3.2.1.13 Stone Sinks

A miniature rock garden which require less attention can be created in as old-fashioned stone sink. It can be set in a bank raised beds which is supported on stone pillars or like a tub. The plug hole should be kept open with crocks. A layer of crocks set in the bottom. It should be covered with sphagnum peat to prevent over drainage. Fill it up with compost and plant dwarf conifers and low-growing alpine plants and set rocks among these plants or develop it into a miniature "willow-pattern' garden.

3.2.1.14 Rock Garden Plants

A list of low growing hardy plants, bulbs and alpine plants found under green houses are given below. Colourful dwarf conifers selected Juniperus, Cryptomaria, Picea and Thuja etc., dwarf and low growing shrubs forms of Betula, Berberis, Daphne, Erica, Gaultheria, Rhododendron, Salix, Skimmia, Sorbus, Teucrium, Vaccinium etc. When you are choosing plants for Rock-garden be carefull, these does not take too much nourishment from the Alpine or become too big for the size of your rock garden. Most of the plants below establish themselves as perennials.

- i) **Rock Jasmine (Androsae)** : It is a perennial forms, **A. lanuginosa**-bears pink flowers, trailing leaves, 6 inches, easy one to try for rock garden.
- ii) **Bell Flowers (Companula)** : A popular plant grow well if given the well-drained position in sun or pastial shade. **C. carpatica** - with blue, violet, white etc. flower, 6-12 inches in summer, spread easily.

- iii) **Armeria (Thrift)** : A sandy soil suited them. **A. moritima**, flower Red-Pink, 6 inches, early summer; **A. caespitosa**-is a good plant for a scree, flowers lilac – pink, 2 inches, Jun-July.
- iv) **Geranium (Crane’s Bill)** : The dwarf forms are easily grown in sunny, well-drained position, **G. cenerium** - produce pink or white flower in summer, size 3-inches.
- v) **Dianthus** : A few species of this genus are suitable for rock garden. They like sun, **D. alpines** - produce rose colour flower; **D. deltoides**, dark-crimson, white etc. flower, known as Maiden – pink.
- vi) **Linaria (Toad floax)** : The purple golden – tipped flowers of **L. alpina**, appears in spring. Easily raised from seed.
- vii) **Helianthemum (Sun Rose)** : It has large number of varieties which produce, yellow scarlet flowers. Mixed colour may be obtain from open seed good ground cover for dry, sunny spots.
- viii) **Dryas (Mountain Avens)** : A mat-forming plant with attractive leaves and white strawberry- like flowers.
- ix) **Sedum** : Useful plants for hot dry bare places. It can easily propagated by division. **S. spurium** – produce carmine flowers in autumn and pleasant rather warm looking, cappery – red and green foliage.
- x) **Primula (Primrose)** : A wide range of varieties of plant requiring different conditions. **P. rosea**, var. “Grondiflora”, rose conrmine flowers, 6 inches, spring flowering, rich moist loam in Semi-shade. There are many fine hybrids of there and other species, good for Rock-gardens.
- xi) **Oxalis** : It is good for rock-garden, **O. enneaphylla** - has pink or snow white flowers, 2-inches, spring flowering. A plant for partial shade.
- xii) **Rannunculus** : **R. amplexcaulis**, large white butter cup flowers, 8 inches, spring to early summer flowering. **R. gramineaus**, -golden yellow flower, 6-12 inches. These are easy to grow in moist soil.
- xiii) **Thymus** : This fragrant herb has a number of species which can grown in hot sunny places. They form mats of delicate leaves and small flowers are prolific in summer. ‘Silver Queen’ has variegated foliage.
- xiv) **Veronica (Speed well)** : **V. prostrata**, blue flowers, 6 inches, summer trailing. There are several varieties in different shades.

Beside these flowering plants, there are several other also like – Sempervivum, Ramonda; Pulsatilla; Saxifrage, Ponstemon; Potentilla; Achillea, Gentiana; Candytufts etc can grow easily in rock gardens.

Check Your Progress Exercise 1

Note : a) Space is given below for answers.

b) Compare your answer with that given at the end of the unit.

1) What is a Rock – Garden ?

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2) What are the different type of stone used in Rock Garden ?

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3) Describe the media used for Rock Garden plants.

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4) Name any five flowering plants grown in Rock Garden.

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3.2.2 Water Gardens

Now we will discuss about the water garden. You must have seen plants growing in water ponds. It is known as water garden. Water garden adds a new dimension to any garden. Its ever-changing face reflects the open sky and the passing clouds. Its surface ripples gently in the wind or is troubled by the playing of a fountain, while beneath the surface, in the transparent depth, the gold, red, and orange gleams of gold fish flash as they move dreamily among the water lily stems, in an attractive water garden.

A water garden is such a distinct feature of the any type garden, that its placing in the total garden plan require considerable care. However, the needs of the water pond itself do much to determine where it may or may not go. Water plants really need plenty of light to flourish and so do fish.



Water Garden

3.2.2.1 Sight selection for Water Garden

Selection of sight to develop water garden, should always be away from the trees, because rotting of leaves which fall in the water from nearby trees and vegetation is likely to poison the fish in the water pond. The natural position for a pond is at the lowest level of the garden so that the surface is always visible. Whether the water pond is to be formal or informal, it is best to site it as a focal point in the garden. Shelter in the water garden can be provided by planting of tall evergreen waterside plants on the north side. Marginal plants will provide some shade as fish require, although they need the light, fishes in the water pond do not like direct sun all day.

3.2.2.2 Shape of Water Garden

Water garden pond should be of geometrical shape or irregular in outline, depends on the general garden design. For formal water pond, the oval or hexagonal may be just as pleasing as square, rectangular or round ones. A cross shape pool would have a functional advantages for those who wanted to breed different types of fish in different part of the pool. The profile of pool in depth may include edges of pool for marginal plants.

3.2.2.3 Size of Water Garden

Size of water garden, depend on the garden size where it is to be developed but water area of the pond should be as large as possible. Giant sized plastic washing bowls can be used to make miniature water garden for specialized purpose. Such as growing a particular plant, but for all practical purpose size of water garden is important because most aquatic plants are rampant and nothing is worse than to see a pond over crowded with plants with no open surface area to act as a background to the foliage and flowers. It will give a clear view of the fishes and reflection of the sky. In addition, the smaller the pool the greater will be the fluctuation in water temperature.

3.2.2.4 Depth of the Water Garden Pond

Depth of the water garden pond is also an important factor to develop a water garden. A shallow pond will make difficult for fish to escape excessive summer

heat or intense cold in winter. Some aquatic plants also will not grow properly in shallow water pond. A considerable proportion of the pond should be at least 24 inches deep. But for development of water lilies and fish it should be more. If you are constructing edges of pool for marginal instead of supporting them on blocks in containers, part of the pond may be half that depth.

3.2.2.5 Time of Construction of Water Garden Pond

The best time for construction of composition lined or plastic pool for garden is in the early spring, which will allow the plants to settle into the pool as they start their vigorous growth. However for concrete pond frost free autumn weather is best. Filled up the pond with water and left over winter. Fill the empty pond several times over period of several days so that any free lime from the cement, which would otherwise poison both plants and fish, is leached out.

3.2.2.6 Treatment of Water Garden Pond

Treat the concrete pond with a 'Curing' solution which will prevent further lime from leaking in the Pond. This period would also expose leaks which must be discovered before plantation. However, plastic and composition liners are now so reliable and durable that, unless there is some very special reason. These are chipper and less labour involved in construction than that of concrete constructed pool.

3.2.2.7 Shape of Water Ponds

The shapes of formal pond can be marked out according to the space available. An irregular shape pond can be created by using a length of hosepipe to make the shape. The hosepipe can be laid in attractive curves. Pegs can then be used to stake out the design. When digging the hole, turf or soil around the perimeter of the future pool must be removed. Crazy paving or paving stones are generally laid so that the edges of the stone protrude slightly over the pool to hide its plastics. Gaps between the stones can be filled with low-growing rock plants. Use a spirits level and boards to make sure that all edges are level.

3.2.2.8 Material for Water Garden Ponds

The following materials are require for a water garden ponds:

- i) **Laminated Reinforced Nylon PVC :** The most expensive of in all materials are strong enough to support water in a pool of almost any size. It could be constructed by welding the edges together. You can use cheaper materials in this range would be suitable for pools upto 100 square feet size. For example a pool of 9 feet by 6 feet by 18- inch would require a piece of plastic 9- feet by 12 feet.

Remove any protruding objects in the exceed hole, lined with sand, stretch the material with a slight sag in middle over the using the edging stone to hold it in place, then allow the water to run in gently.

- ii) **Butyl :** It is the most long-lasting and elastic, but also most expensive of the flexible materials. It is generally used for unusually shaped ponds as it does not wrinkle.

- iii) **Polythene** : It is less long-lasting than the materials mentioned above. Its pools should not be drained, as this exposes the polythene to the weather for longer period, cause a rapid deterioration to the polythene sheeting. However, it is cheapest buy, and is best suited to formal pools of regular shape. It does not stretch much. Use double thickness 500 grade and allow a shallow 30° gradient to the sides. Allow on overlap of 12 inches all round on the edges so that the edges can be flooded over when weighted down.
- iv) **Preshaped Plastic Liners** : These are purpose made and may be either dug to the dimensions for which they are designed. The rigid ones are more expensive and about four time more the price of some of the more flexible liners. They may be made in sections which can be fitted together in all short of shapes and size. It is possible to make rigid plastic liners in the excavated hole using polyester resins and hardeners.



Link Ponds of Water Garden. The first large pond uses polythene and other smaller ponds is a concrete one.

3.2.2.9 Waterfalls and Fountains

These are easily made using modern pumps designed for underwater or Pond side operation. The earth taken out for making a pool for water garden, is often piles up to make a Rock-garden in which the above mentioned rigid liners may be incorporated to make a series of lakes. The same pump will send water from the pool into Rock-garden, and emit a jet through a fountain and to the waterfall. It can be operated by physically turning off the fountain or the water-fall. Waterfall should be constructed in such a way that they do not involve too much movement in the body of the pool, as not all plants like moving water, particularly water lilies.

3.2.2.10 Stepping stones in Water Garden Pool

If your water garden pool is large enough, stepping stones of concrete or natural stones are a pleasant feature for water garden. These steps must be used to make sure that they are safe to walk on and do not damage the plastic lining of pool. Nothing look better in water than stones or ornamentation. The choice is wide, some ornaments including fountains or flowing water etc.

3.2.2.11 Bog Garden

These gardens are also a part of water garden. When constructed the pond, allow a slight over lap at one point leading to a bog garden. It may be that in an irregularly shaped pool, instead of trimming the plastic away, it could be allowed to continue into the Bog-garden. It does not matter if the Bog-garden leak a little in fact it should, provided there is a moist sump into which water from the pool can overflow. Bog plants like moisture but they do not want to be drowned.



Bog Garden (Rock Garden)

3.2.2.12 Planting

The best time of planting the aquatic plants in the pool is spring or early summer. They do not need anything, but for root development they require loam, compost, leaf mould, manure, peat and sand. This medium adversely affects the water transparency in the pool. To meet this problem, now plastic containers like basket with perforated sides are available for aquatic plants plantation. It has four corner holes in which you can plant two aquatic plants, one on either side and suspending the container over the pool. It is possible to lower it at the deepest part of water pool without accidents with the help of stringing. These container field with root media for plant growth, plants firmly, ramming the soil around the roots to prevent it being washed away and cover the soil with a layer of clean gravels or pebbles. You should check that you have the right depth of the soil for the roots and right depth of water for plant.

3.2.2.13 Stocking Exigency

It is essential to leave the newly planted pool of water garden for about three to four weeks, for establishment of plants, before introducing fishes in the pool. If the fishes are introduced at the same time as the plants, then the plants may not get settle down and fish can harm them. You are aiming to develop a balanced pool, and once you have the pond stocked with the right types of plants and fishes in the right quantities, the problems such as algae and green water should disappear. It should never be necessary to change the water of a healthy pool of water garden. When you are going to introduced fish in the pool of water garden, keep in mind that **one square foot of water is enough for every two inch fish.**

For example if your pool is 10 feet by 6 feet, equal to 60 sq feet and can accommodate 120 fishes of one inches and 30 fishes each of four inches long.



Golden and other colour Fishes in water Garden Pool

Select the fish according to your taste, but avoid at all costs including cat fish, Perch or Pike and other predators, or Tidlers, from local ponds which may carry diseases. When buying the fishes do not put them straight into the pool of the water garden from the container, as the violent temperature change could kill them. Lay the container in the water pool for few hour and then make the change over. Avoid overfeeding. Hardly feed at all in cold weather. Use a thermostat heater worked from the mains, which will keep the pond at an even temperature without ice completely covering the pool. Cover the pool of water garden in autumn with a wire net or Agro net to keep leaves of plants from falling in the pool.

Goldfish is the name given to selected strains of fish of gold or similar colour. Apart from the true Red-gold 'Goldfish' many fancy colour strains of fishes such as black, silver, Red or yellow have also been available. Other types includes Comets (longtail), Colicos (fantails) and Nymphs (round bodies) are also attractive. Other fishes which are safe to introduce include Golden and Silver orfe, Golden and Silver Rudd and Tench.

3.2.2.14 Scavengers

Goldfishes and other decorative fishes are not purely decorative in that they contribute to the health of pool by scavenging. However, it would not do any harm to introduce a few water snails, about a dozen for a new pool. A pool which has accumulated a fair amount of Muck on the bottom is the ideal place for Tench, which feed on scraps that fall to the bottom. Once introduced, the tench are never seen near the surface again.

3.2.2.15 Recommended Plants for Water Garden

Aquatic plants for water garden have been divided into four groups. These groups are submerged oxygenating plants, floating plants, deep marginals plants, marginal plants, Bog plants group. All these groups of plants are described below one by one:

i) **Submerged Oxygenating Plants** : These plants are generally multiplied by cuttings and may be put in a containers for multiplication. It can be planted anywhere on the bottom of the pool of water garden. Some of them are described below:

- **Ancharis Canadensis (Water thujme)** : It is a Canadian pond weed or American pondweed. It has dark green mass, brittle stem, check uncontrolled development.
- **Ceratophyllum olemersum (Horn-wort)** : It has dark-green bristle-like leaves, handle with care and plant in deepest part of the pool.
- **Egeria Densa (Syn. Elodea Densa)** : A dark green plant often found in indoor gardens, slightly tender in structure.
- **Lagarosiphon Major (syn. Elodea Cripisa)**: It has long stems with leaves that curl backwards.
- **Myrriophyllum Spicatum (Water milfoil)** : It has delicate- looking leaves and stem, found in fresh-water in Britain, India etc.
- **Ranunculus Aqualitis (Water Crow fool)** : Its foliage and white butter cup-shaped flowers reach to the surface.

ii) **Water Lilies** : A wide range of brilliant hybrids of water lilies are available, flowering from June to September. There hybrids varying considerably in vigor used them accordingly which will are suit to the pools. Some are miniature type which can grow in a few inches of water, other needs four to five feet of water to flourish. They need special care when fixing the roots in their pots. The white floating roots are old anchorage roots and these should be cut off. The young feeding roots are black and fibrous. They should be kept and planted firmly in the moist soil. Tubrous types should be inserted in the soil horizontally with the crown just above the soil of pool of water garden. Place plenty of gravel, pebbles and even heavy stones over the soil to keep lily from floating upwards. Place containers of lily plants on blocks height in the water and gradually lover it by removing the blocks, as the stem developed. Water lilies may be thinned out by removing unwanted clumps with a knife. Propagate these lilies from the “eyes” taken from the roots in spring. There is a large range in lilies, some of them described below with requirement of water depth in the water garden pool :

- **Red Attraction**: Deep red, large flowers, edges white, plant 18 inches to 2 feet or more deep water pool.
- **Escarboucle** : Brilliant red flowers, large and prolific, very popular, plant in 10 inches to 2 feet deep water.
- **James Brydon** : Cormine flowers, purple leaves, becoming green, stands shade, plant in 18 inches to 2 feet deep water.
- **Layde Keri Hybrids**: Red, purple, carmine, rose, flowers, plant in 3-18 inches deep water.
- **Pink “MME wilfrom Gonnere”** : Fine beautiful pink flowers, fully shaped with many-petalled, plant in 18 inches to 2 feet deep water.
- **Nymphaea Odorata (Turicensis)** : Fragrant rose colour flowers, plant in 1 feet to 18 inches deep water.

- **N. adorate “Sulphurea”** : Soft yellow star-shaped flowers, held well above the water, plant in 3 to 18 inches deep water.
- **N. candida** : Small white flowers with red stigma, not vigorous, plant in 3-18 inches deep water.
- **Pygmaea, Helvola** : A true miniature type with delicate yellow flowers, plant in 3 to 12 inches deep water etc.

iii) **Floating Plants** : These plants require no containers for plantation and are placed on surface of the pond of water garden. Some time these plants sink at first but rise to the surface again. They are very valuable for water garden pond because they reduce algae and provide vegetation for the fishes to nibble. About four plants are sufficient for a pool of 9 x 6 feet. These plants are different type some of them are described below.

- **Azolla Caroliniana (Fairy Moss)** : It has green many fronds changing to red and brown at the end of summer, needs over-watering in frost-free conditions but invasive in summer.
- **Hydrocharis Morsusranaea (Frogbit)** : It has water-lily-like leaves, white flowers in July-August, the plant sinks in winter but comes to the surface again in spring.
- **Stratiotes Aloides (Water Soldier)** : It has spiky dark green leaves, white flowers, also rest at bottom in winter.

iv) **Deep Marginal Plants** : Beside water lilies, there are a number of other decorative plants for water garden which produce floating leaves and their flowers appear above the surface of water. These can be planted in containers under 6-18 inches of water. About two such plants are enough for a water garden pool of 9 x 5 feet. Some of them are given below:

- **Aponogetem Distachyum (Water hawthron)** : It has oblong dissected leaves, white fragrant flowers from spring onwards, plant in 15-18 inches deep water.
- **Hottonia Palustris (Water Violet)** : It is some time placed among sub-merged oxygenators because the finely divided foliage remain below the surface of the pond. It produced lilac or white flowers about one foot above the surface of water garden pond in summer season. It overwinters on the bottom in the mud. Plant in 6-18 inches deep of water.
- **Nymphoides Peltala (Water Fringe)** : It has floating water-lily like leaves, fringed yellow flowers in summer. Plant in 6-18 inches of deep water.
- **Orantium Aquaticum (Golden Club)** : It has broad bluish- green leaves, golden yellow tipped flowers spekes in spring, roots must be lodged deep in soil so it cannot be grown at the edge of sloping sides. Plant in 6-18 inches deep water.

v) **Marginal Plants** : This group include a wide range of water plants including some highly decorative rushes and sedges and can be grown at the margin of pond. Plant these in about 3 inches of soil in shallow containers with about 3 inches of water above the top of container. About ten such plants

will be enough for a pool of 9 ft. X 6 ft. Some plants of this group are described below:

- **Caltha Palustris “Plena” (King cup, Marsh Marigold)** : It has dark-green wavy leaves, rich double golden flowers; 6-9 inches; wet soil to 3 inches of water over the crown.
- **Calula Coronopifolia (Brass Buttons)** : It has smooth green leaves, long lasting bright yellow flowers, long growing, wet soil to 3 inches deep water.
- **Cyperus Longus (Sweet Galingale)** : It has rusty leaves up to four feet, dark brown flowers in summer, wet soil to 3 inches of water.
- **Glyceria Aquatica “Variegata” (Manna Grass, Reed Grass)** : It has thin strap - like leaves striped green and gold, 18 inches or more deep water.
- **Iris** : This large genus provides several beautiful water plants. Some of which should be in every pool of water garden. **I. kaempferi** - with huge flowers of orchid like quality, **I. laevigata** : **I. pseudacorus- I-sibirica** etc. All bloom from spring to summer.
- **Mimubus Guttatus (Monkey Musk)** : It has perfoliated leaves, brownish - red - spotted flowers in summer, wet soil to 3 inches.
- **Myosotis Palustris (Water Forget - me - not)** : It has bright blue flowers, low-growing, wet soil to 3 inches.
- **Pontederia Cardala (Pickered Weed)** : It has heart - shaped leaves and blue flowers spikes, 18 inches or more.
- **Ranunculus Lingua “Grandiflorus” (Great Spearwort)** : It has narrow leaves, butter cup - like flowers, 2 ft. or more water in pool.
- **Typha Latifolia (Great Reed Mace)** : It has rush - like, bearing brown spikes upto a foot - long; 6 ft. or more.

vi) **Bog Plants** : Most of the above marginals plants can be treated as bog garden plants. But **Iris Kaempferi** and the **marsh marigold** are specially suitable for growing in Bog-gardens. These are many other plants which can be grown in Bog garden. Some of them are described below:

- **Aconitum napellus (Mankes hood)** : It has divided leaves, purple, blue flowers, in early summer, reaching 3 ft. or more.
- **Cardamine Pratense (Lady’s Smock, Cuckoo Flower)** : It produce pretty Lilae or pale violet flower, in spring to summer, to 18 inches.
- **Gunnera manicata** : It has giant rhubark - like leaves, which may reach 8 ft. across; only for larg Bog garden.
- **Helonia Bullata (Swamp- Pink, Stud Flower)** : It develop rosettes of short, sword - like leaves, rich pink spike in spring, 1 foot height.
- **Lythrum Salicaria (Purple loosestrife)** : There are several cultivated varieties of this beautiful flower plant with purple to rose-like florescence’s in July.
- **Orchis maderensis** : It has long leaves, tall purple flower spikes in summer, 1 foot to 18 inches.

- **Osmunda regalis (Royal Fern)** : It fronds can reach well over 4 feet long; conspicuous fertile fronds; russet autumn leaves.
- **Primula Busiana** : It has rosy - purple flowers with yellow eye, in May, 2 feet or more.

3.2.3 Indoor Gardens

A new craze is developing in metropolitan cities where most of the people live in flats or small houses and they do not have space for outdoor gardening but they want to develop garden. For these people new concept of indoor gardening is developed. In indoor gardening mostly foliage, plants and climbers bulbous, Cacti and succulents plants are used in pots or Containers. These garden developed with the help of plants grown in pots, containers etc to put them together in a shape of miniature garden.

The people who have small house, they started to develop basements, which are being fitted with powerful electric lamp and misting cooler to develop essential environment for indoor plants, used for indoor gardening. Many type of plants can be grown under these condition. These structure are a sort of glass- house without glass. If you have a basement, consider it an artificial garden or indoor garden with containers.

Some flats have tiny courtyards available for container gardens and one or two trees. Some with above the ground flats, window - sills, doorways, staircases, and balconies can be utilised for indoor gardening.

3.2.3.1 Problems of Indoor Garden

- i) The big problem with indoor gardening in containers is not so much, but the selection of suitable plants to fill them. The most important aspect is the space available for roots. Some boxes and urns, while charming to look at, are impractical in this respect.
- ii) The 2nd important consideration is the provision for drainage. We have to make necessary arrangement to control it, so that our garden will remain neat and clean.

3.2.3.2 Type of Containers for Indoor Gardening

There are wide variety of containers available on garden shops, garden centre and nursery man stock. Some are expensive, other comparatively cheap.

Wooden tub containers can be round, like an old type of beer - barred or square, with either sloping sides or vertical. The most durable are made of teak wood which do not require painting. Cedar also stands up well to the dampness of soil.

Some **clay pots** are also available. They are in different sizes and shape, some plain and other ornamental. A range of terracotta pots in different size, designed and in attractive colour are also available in the market for Indoor Gardening.

Now a ranges of fibre-glass containers are also available which simulate lead; Modern reproduction, convincing in colour finish. These are less expensive and handsome old century pots are also available in the garden shops. These fiber-

glass containers are light in weight, strong, durable and do not hamper plant growth. They are easy, to carry from one place to other place and in handling.



Containers for Indoor Gardening

3.2.3.3 Soil / Media for Indoor Garden Containers

The plants generally grown in the containers for Indoor gardening have different type of soil in the containers for different type of plants. These plants may be bushes, small trees, semi-woody foliage plants, climber foliage plants, bulbous Indoor plants, and cacti and succulents. All these types of plants require different media & soil for containers to grow well. These media or soil of different type are described below :

- A) **Potting Mixture / Soil for Woody and Semi-wood Indoor Plants :** These plants generally require a heavy texture mixture, specially for large pots plants. The suitable media / soil for such indoor plants have been described below:
 - i) **Soil- Based Potting Mixture :** It is a heavy mixture, suitable for larger, established and top-heavy foliage plants. This mixture of consist of one - third sterilized fibrous loam, one third medium - grade peat mass or leaf mould or tree - bark and one - third coarse sand or fine partite. A balanced fertilizer dose should be added to the mixture.
 - ii) **Peat - Based Potting Mixture :** It is a light - weight standardised mixture, containing very few nutrients. A suitable homemade mixture of this type consist of one - third medium grade vermiculite and coarse sand or medium grade perlite. Add two table spoon full of dolomite lime stone powder to every half- litter of mixture control the acidity of the peat.
- B) **Potting Mixture for Indoor Climbers :** Indoor climber require a heavy mixture to stand the plant properly on moss - column. There for soil - based potting mixture is suitable for these plants, as mention above.
- C) **Potting Mixture for Indoor Bulbous Plants**

The Indoor bulbous ornamental plants need two type of potting mixture

- i) Soil based potting mixture as described above.
- ii) **Bulb - Fiber potting Mixture :** It is used only for Indoor bulbs pot

plants. It does not contain enough nutrients as for other pot plants. It gives good drainage which is essential to prevent bulbs from rotting. A suitable homemade mixture consists of six part of peat moss, two part crushed oyster shell, and one part charcoal (6:2:1). This mixture is good for all indoor bulb plants in pot, except lilies which require soil based of potting mixture.

D) Potting Mixture / Soil Media for Cacti & Succulents : Choosing the growing media for cacti and succulents is extremely important for their cultivation in the Indoor garden. It is one of the essential element in the success of all future operation. Most cacti and succulents like a slightly acidic soil / media (pH 5.5 to 6.5) for proper growing in Indoor as well as outdoor plantation. The following five type of media / soil mixture for growing of cacti & succulents in pot are recommended :

- i) One - third sand (river sand is preferred), one - third well rotted vegetable mould / leaf mould and one - third sifted soil (1:1:1). This is suitable for most of the Cacti and Succulents.
- ii) 2 part sea - sand, slightly fibrous garden loam free of unrotted organic matter : 1 part coarse river or lak sand : 1 part very fine grit : a little granular fertilizer according pH of media. This compost / media is suitable for - opuntia, cereus and similar genera, echinopsis and Mammillaria. For Selnicerosus and Apocactus. 1 part well - rotted leaf mould should be added. Most of the succulents like this type of potting media.
- iii) Soil that is predominantly inorganic : 3 part sand : 2 part garden loam : 1 part leaf mould : 1 part grit. This media suitable for Echinocactus and similar genera; Echinocactus, Astrophytum and Gymnocalycium, may need the loam reduce to 1 part and leaf mould increase into 2 parts.
- iv) Equal part of garden loam, leaf mould, and sand : ½ part grit : a little granular fertilizer if pH permit. This media is suitable for Echinocactus; Rubutia and Lobelia. The leaf mold may be reduced to ½ part, the ½ part being made up with peat.
- v) Equal part loam: leaf mould and sand with little fertilizer consisting at most entirely of Phosphates. This is suitable for Euphorbia and Schimbergia. For Rhipsalis, fibrous peat be suitable for Loam. Most of the succulents like this type of media.

3.2.3.4 Planting for Indoor Gardens

Planting can be permanent or seasonal in containers. Box bushes, small trees, Portuguese laurels, Ficus family. Yuccas, Skimmias, Viburnum tinus, Mahonia Japonica other similar shrubs, foliage, climber, bulbs and cacti & succulents are all useful for indoor gardening. Beside these perennial foliage plants. We can also grow some seasonal flower plants for indoor Gardening.

Potentillas in shrub form, Camellias, Azaleas and Rhododendrons are excellent for containers growing, sited in shady area but require protection or shelter from cold winds.



Pot Arrangement in Indoor Garden

Hydrangeas and hardy Fuchsias need full sun. Variety and colour must be the aim for indoor gardening. For this, bulbs on their own or combined with bedding plants are ideal.

Seasonal planting is relatively easy as there is a wide choice starting in early spring with early spring flowering bulbs.

Hyacinths are particularly attractive in containers of all kind as they are perfect in form and their range of pasted colour and pleasant sent make them a triple treat.

Daffodils and Tulips of all type do well in containers and provide a spring like splash of colour in indoor gardening.

Lilies are also look attractive in container of indoor garden. By choosing a particular type and variety, containers can be made to produce superb shows of lilies from June to the autumn in indoor gardens.



Indoor Garden

Short stemmed bedding Dahlias in a host of colours will flower in spring in containers.

Herbaceous plants like double Daisies and Polyanthus can be added in containers planted with bulbs for spring colour, while Pelargoniums, Petunias, Nicotiana, Heliotropes and Alyssum can spread colour in indoor garden in the early winter to early summer.

Pansies and **voila** can be interplanted with Hyacinths; Muscari and Scilla are most effective with Diffodils as are Myosotis and Wallflowers with Tulips.

There are several other semi woody or soft woody trees, climbers indoor foliage plants, bulbs, cactus and succulents can also grown successfully in indoor garden. The all cultural practices of these indoor pot plants have been given in the earlier units of this course, in detail for your consideration.

3.2.3.5 Watering to Indoor Gardens

One of the secret of success with indoor - gardening in containers is proper watering. Never over - water, but on the other hand do not let containers, boxes, tube or pots dry out completely. It should be done properly in time.

3.2.3.6 Application of Fertilizer to Indoor Garden Plants

You should remember too that plants in confined space of pot exhaust nourishment. Generally, bulbs need no fertilizer but all other containers plant should have their soil renewed or partially renewed at the top and if this is impossible because of permanent plantings, nourishment should be replaced by application of bone - meal, liquid manure, dried manure, or balanced fertilizer. The methods of fertigation are given in the previous units of indoor plants in detail.

3.2.3.7 Maintenance of Indoor Garden

All these permanent indoor plants require timely potting, repotting, recycling and protection from enemies, procedures for these operation have been given in detain for your study, in the previous units on indoor plants.

Those who want to develop indoor garden on multi-storied flat or in balconies, they can use fiber - glass or plastic containers to grown indoor plants because they are light in weight and hence easy to lift and move to high places of the houses.

Check Your Progress Exercise 2

Note : a) Space is given below for answers.

b) Compare your answer with that given at the end of the unit.

1) What is the ideal sight for water garden ?

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2) What are the materials used in developing water garden ?

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3) Write down the names of two plants each from the group of submerged oxygenating aquatic plants, floating water plants. Deep marginal and marginal plants of water garden.

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4) What type of plants are used to develop indoor garden ?

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3.3 LET US SUM UP

In this unit, you have studied about special type of garden like-rock garden, water garden and indoor garden. We have discussed with you in detail the development of these garden, essential material required to develop these garden, different type of features to be developed in these garden, plants used to develop these garden with their cultural methods etc and problems which we faced to develop these gardens.

3.4 KEY WORDS

Portland Stone : A coloured rock developed artificially by cement with a solution of Iron sulphate in any shape or size known as part land stone.

Hyper Tufa : It is also an artificial rock developed by mixing two part peat, with one part each of sand and cement, mixed it properly and then add water to it to make a thick cream which you have poured into large hole (develop in the land), you can add any cement colour of your choice to this thick cream cement to develop coloured Hyper Tufa. On dry the product known as hypertufa rock used, for rock garden.

- Stone Sink** : When a miniature rock garden is created in old-fashioned, is known as stone - sink. It can be set in a bank raised bed which is supported on stone pillars or like a tube.
- Water Plants** : The group of plants which can be developed or grown in the water pool or pond known as water plants.
- Polythene** : It is a plastic sheet in elastic form are used to develop polystructure and water gardening.
- Goldfish** : It is an ornamental gold colour fish used in water garden pools to make them attractive.
- Scavenger** : An animal, fish or bird which search for decaying flesh as food.

3.5 FURTHER REFERENCES

- 1) **Dorling Kindersley** : Pocket encyclopaedia of house plants.
- 2) **Kenneth A. Beckett** : The concise encyclopaedia of garden plants.
- 3) **Dr. Vishnu Swarup** : Garden Flowers.
- 4) **Roger Grounds** : Ward lock's gardening in colour.
- 5) **Miles Anderson** : The ward encyclopaedia of cacti & succulents
- 6) **Mariella Pizzethi** : The MacDonald Encyclopaedie of cacti.

3.6 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) When a garden is developed with the help of different type rocks and stones or on rocks, with ornamental plants is known a Rock – garden.
- 2) The different type of stone used in Rock-garden are limestone, Port landstone, sandstone Tufa stone, Granite stone and local rock.
- 3) The best media for Rock-garden is – four part loam, Two part humus and two part grift (4:2:2) is used.
- 4) Five flowering plants for rock garden are – Bell flower (campanula), Geranium (Crane's Bill), Dianthus, Premula (Primrose), and oxalis.

Check Your Progress Exercise 2

- 1) Ideal sight to develop water garden should be away from the trees, because faded leaves of plants leaf will fall in the water and rotting of leaves from nearby trees and vegetation is likely to poison the fish in the water Bond.
- 2) The materials require to develop a water garden are laminated reinforced Nylone PVC, Butyl, Polythene, Preshaped Plastic Liners, Plant material and fishes (stockings).

Landscaping

- 3) The plants are – Water lilies (Nymphaea), James Bridon; Azolla Caroliniana (Fairy moss), Hydrocharis morsus-ranae (Frogbit); Hottonia Palustris (Water violet), Orontium aquaticum (golden club) and Mimulus guttatus (Monkey musk) Cyperus longus (Sweet galangale).
- 4) These is a large range of plants used to develop Indoor garden such as - Box bushes, Ficus plant species, Yuccas, Viburnum tinus, Semi-woody indoor Plants, Foliage climbers, Indoor Plants - Hyacinths, Daffodils etc and Cacti and Succulents etc.

