

Vegetative Techniques

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Industrialisation undoubtedly brought about rapid development, but left man weary. The reason primarily being that man began to recede from Nature. Soon man has realised that his well-being lay in the vast resources bestowed by nature. Its vitality conveyed through its vast stretches comprising of trees & shrubs, intermingled with rich hues of foliage and flowers. Gradually, through experience man to some extent understood the very purpose of vegetative cover. Its importance in containing the problems of pollution and sustaining an ecological balance to provide a healthy environment around human settlement for human development. And, knowingly or unknowingly man began to value landscape for its intrinsic character. This character is acquired through the interplay of the basic components of nature, namely, landforms water and vegetation. Each of these components have a well defined and distinct traits. However, here the most valuable natural resource - the vegetative cover and its techniques will be dealt with.

The entire plant material can be broadly characterised as trees, shrubs, ground cover and climbers.

The trees are plants. They live and die very much as do other plants. The principal differences between trees and other form of the vegetation are that trees :

- a) Attain the great age
- b) grow relatively slow
- c) have woody trunks and branches.

Of all the elements in our landscape, the trees have the greatest capacity to bring the presence of nature into the built-in environment. Even a single mature tree can soften the uncompromising angular shape of the modern building.

Proper tree selection and mangement must depend upon both climatic condition and soil condition. Tree planting management strategies should response to microclimatic conditions, soil conditions, wild-life management requirement in natural area.

The following aspects should be borne in mind while making the selection of plant material especially trees.

- a) function
- b) visual effect
- c) existing planting
- d) Soil
- e) Siting
- f) Ecology
- g) Availability of species.

Trees provide significant values to natural environment, for instance,

- i) to improve the urban soil condition, ii) improvement in the functioning of hydrological balance of nature, iii) increase in the diversity and planting of wildlife, iv) moderation of extreme urban microclimate.

Besides the above values, trees are planted for a number of purposes, for example, i) to create or reinforce the spaces, ii) to provide shade, iii) to impart scale to the buildings, to provide colour and form, to act as a noise baffle, visual improvement of the environment, iv) to use as wind break.

The selection of most appropriate species of trees for a particular location and function profoundly influence the quality of a design. While referring to a particular complex, The choice of the trees for enhancing the design quality is based on single type that will grow best in the locality.

Parameters for Selecting the Plant Material/Tree for Various Uses.

Tree growing together in natural communities tend to look compatible when planted together. Selecting one or several species from plan community on each soil conditions encountered might be the initial step in evolving a set of appropriate tree type for discrete site conditions. The chief uses to which trees may be put are follows :

1. As a mean of linking up the neighbourhood with the open country, softening and breaking the hard lines of artificial structure.
2. To emphasize or frame the architectural features of importance by means of avenue or fore ground planting or by the creation of vistas.
3. To screen unsightly objects and undesirable features such as factory dumps, backyard gardens.
4. To screen against head lamp dazzle and serve as a baffle to noise.
5. To draw attention as a safety measures to dangerous junctions, bands or curves white or pale yellow trees are suitable for this purpose.
6. To add to the colors and variety to existing vegetation - where this is desirable. To serve as a wind break in exposed areas.

In the industrial context the criteria for the plant selection includes :

1. Provision of thick tree cover should be made between industrial and residential areas to facilitate the dilution and dispersal of unavoidable pollutants.
2. It is desirable to choose shady, evergreen, flowering plants in industrial area. The plant should be good sound absorbant and should be resistant to the action of chemicals and smoke.
3. Ability to withstand polluted atmosphere and unfavourable soil conditions.
4. The species should suit to the soil and climatic conditions.
5. The species should be hard, robust, should need little attention once they have achieved certain stature.
6. The species must be fast growing and wind resistant.
7. The species should be disease and pollution resistant and should possess aesthetic values.
8. Spraying of insecticides should be avoided as it may add to the atmospheric pollution and injurious to the health of the people. In such areas biological control should be achieved rather than chemical control by planning of trees and shrubs which attract insects which eat away the harmful insects themselves.

The typical situation in which plant material can play a significant role especially in industrial development are :

1. Boundary planting in the form of buffers and shelter belts
2. Afforestation in areas not under immediate development, especially in the plant site,
3. Reclamation of environmentally degraded areas,
4. Visual enhancement of strategic location such as entrance zones and administrative campuses.
5. Road sit plantation,
6. Residential sectors and individual housing clusters,
7. Areas around community recreational facilities.

Boundary Planting/Shelter Belts Plantation

Trees can be effective mechanism for obstructing and deflecting the wind, when planted at right angle to the direction of prevailing wind. Well designed shelter belts reduce the wind towards leeward side for a distance of 20-30 times their height. The wind break can be effective moderator of wind velocities extreme in the urban climate. The effectiveness of the wind break depends on the height, width and permeability of the trees planted and overall length of the wind break. As trees mature, they often tend to loose their lower branches in a wind break this results in the opening of a hole through which the wind is channelled and its velocity increased. While the zone of influence of a wind break may extend to 3 times its height to the wind ward side and 30-40 times its height to the leeward side, the maximum effect of a wind break is achieved at 3-5 times its height on the leeward side.

The width of a wind break has a negligible effect on the size of the area that will be protected. It may even reduce the size of the protected area.

In addition to obstructing and deflecting air flow, trees can be also used to guide or channel wind and reduce its velocity through functional drag crested as wind passes over the twig, branches, leaves and trunk of the tree.

Trees Suitable for Shelter Belt

A tree which is to serve as a wind break must be supple and strong with a good anchoring root system and tough, well attached leaves. Branches must be thick and come closer to the ground. Plants for wind break should stand crowding and drought and they should not attract insects

Casuarina
Grevillea robusta
Terminalia
Melia azadirachta
Cassia fistula

Trees Suitable for Green Belt (Afforestation Belt)

Acacia auriculae formis
Acacia monoliformis
Albizia lebbbeck
Delonix regia
Butea monosperma/Butea frondosa
Ailanthus excelsa
Bauhinia Variegata
Kigelia pinnata
Lagerstoremia flosreginae
Millingtonia hortensis
Pterospermum acerifolium
Pongamia glabra
Thespesia populnea
Melia azadirachta

Reclamation of Environmentally Degraded Zones

The following trees are recommended :

Moist Condition

Bauhinia purpurea
Bauhinia varegata
Cassia nodosa
Lagerstroemia indica

Dry Condition

Azadirachta indica
Butea monosperma
Cassia fistula
Cordia Sebiana
Cochlospermum Spp
Erythrina indica
Erythrina blakeii
Pongamia pinnata
Sterculia colorata

Tecomellia undulata
Thespesia populnea

Drought Areas

Albizia lebbbeck
Cassia fistula
Casuarina equisetifolia
Morus indica
Phoenix dactylifera
Butea monosperma

Swamp and Marshy Areas

Eucalyptus
Musa Spp
Salix Spp
Tamarix Spp

Salt Resistance Condition

Emblica officinale
Eucalyptus Citriodora
Phoenix dactylifera

Road Side Plantation Criteria

1. The Trees should be selected with due regard to its mature size, good appearance and likely usefulness and adaptability to the existing site conditions.
2. The trees should be selected with due regard to soil, rainfall temperature and water table.
3. The species should be capable of developing a straight and clean trunk up to a height of 3 meter from the ground level and beyond this, they should be developed, nearly spreading and good crown.
4. The selected tree should be hardy, fast growing and wind firm and should not be thorny and drop to many leaves.
5. The tree should be deep rooted, as shallow roots injure the pavement.
6. The commercial, aesthetic and social value of the trees should also be taken while making the choice.
7. The trees which will be come very wide are undesirable if their maintenance cause problem

with traffic flow.

8. There should be clearance of 8'-0" over foot path and 16'-6" over roadways.
9. Large trees can be responsible for treacherous road surfaces and slippery pavements at leaf fall
10. Shade effects must be considered when planting close to inhabited areas.

Trees Suitable for Various Roads

Tree planting is arranged in such a way to avoid interference with sight distances. At maturity, the height and spread of full grown tree will be in scale with the proposed use.

Trees suitable for National Highways & District Highways

1. Albizzia Procera (Safed Siris)
2. Azadirachta indica (Neem)
3. Dalbergia sisso (Shishm)
4. Mangifera indica (Mango)
5. Samanea Saman (Rain Tree)
6. Tamarindus indica (Imli)
7. Bassia latifolia (Mahua)

Trees Suitable for Town Roads

Shade and economic utilities should be the main criteria :

- Flowering Trees - Delonix regia (Gulmohar)
- Cassia Fistula (Amaltas)
 - Jacranda Mimosaefolia
 - Erythrina indica
 - Spathodea Campanulaata (Pickari)

- Shady Trees :
- Ficus retusa
 - Ficus infectoria
 - Eugenia jamboliana
 - Mimusops elengi
 - Eugenia operculata

Medium & Small Size Avenue

- Averrhoa Carambola (Amrak)
- Alstonia scholaris

Callistemon lanceo latus

Polyathia longfolia

Putranjiva rexburghii

Car Parking

Any plant material selected for car parks should be hardy enough for the harsh environment and easy to maintain. Trees not only provide shade but also improve the environment. The tree selected for various car parks should satisfy the following criteria :

Height and Spread

Every tree selected must have atleast 3 m. over head clearance. Trees used at the side of the car parks should not touch the edges of the building when fully grown. Trees used in the central divider should have preferably dense crown with up right main branches and laterally spreading side branches provide the desired shade. No brittle, dropping trees should be used.

Texture

Trees of strong and medium texture are preferred. The shadow from the strong textured trees will provide beautiful shadow on the ground.

Shade

Evergreen trees with mass foliage and lateral branching pattern are the most suitable trees for the purpose.

Fruits and Seeds

Trees with large fruit and seeds can be harmful to the vehicles parked underneath. Beside fruit attracts an acid excreta of the birds may cause nuisance to the car owner. It is therefore recommended that trees of fruits and seeds should not be planted in the parking areas.

Trees in the Residential Area

Trees planted near houses or impervious surfaces are likely to extend their root more rapidly into the covered area that receive no direct rainfall. Under these conditions the root activity will be greater than normal as the roots search further for moisture, thus the depletion of the limited soil moisture will excessive result in large shrinkage movement and damage to structure.

When abnormally dry spell occurs, drying goes to the

greater depth and these conditions have more serious effects on trees and shrubs present. During the dry weather the clay not only receives less rainfall, but the increased radiation on the trees in full leaf causes the transpiration to increase and root system to spread thus lessening still further the moisture content of the soil.

The movement associated with these seasonal changes are greatest at the surface and decreases with the depth until about 5'-6' -0" below the surface. In the vicinity of fast growing trees these drying effects of the roots cause increased shrinkage and affect the clay to a great extent and consequently present more serious problems with regard to mouse foundation. It is note worthy that the root system of an isolated tree generally spread to a radius greater than the height of the tree, the average of all species have a maximum root length of 1.3 time the tree height.

It is generally considered inadvisable to plant very fast growing trees such as poplar closer than 120'-0" to the nearest wall or building and on clay soil. On the light soil the distance may be reduced to 60'-0".

Low Cost Housing

In designing planting for low cost housing development planting to be kept to a minimum.

1. They must be capable of surviving with or little maintenance.
2. The creation of out door living spaces and installation of plant species masses to baffle the noise and screen objectionable view to provide pleasant surrounding.
3. Ability to withstand drought.

Trees Considered Suitable for Car Park Area

1. Ceiba pentandra
2. Chorisia Speciosa
3. Cassia Fistula
4. Chukrassia Tabularis
5. Gmelina Arborea

Trees Suitable for Central Verge

1. Grevillea robusta
2. Lagerstomia flosreignae
3. Melia indica
4. Mimusops elengi

5. Peltophorum ferrigeneum
6. Polyalthia longifolia
7. Putranjiva roxburghii
8. Phyllanthus embilica

Landscape Treatment of Rotary Intersection

The treatment of rotary depends on several criteria i.e., size, location. Normally rotary intersections are turfed overall and planted with shrubs and winter flowers. Features like fountains, sculpture and rolling ground can be provided, depend on the size. The basic principle of treatment is to improve and harmonies with the surrounding landscape.

Areas Around Community Recreational Facilities

Urban City Centre

Criteria

1. Plant must be tolerant to air pollution
2. Resistant to noise and dust
3. Root restriction
4. Heat, cold, wind or rugged condition
5. Resistant to disease and pest

Shopping Centre

Most of the shopping centres provide some protection from wind therefore the more exotic species can be used in planting the area. The trees selected may act as a specimen and in a small space imparting the sense of bigger area. The informal masses of small trees can be used. In general, the trees must be flowering and impart colour in the various seasons of the year. Thus the following are listed below:

To create and develop site conditions rapidly.

An ability to withstand polluted atmosphere and unfavourable soil conditions and the fixing of nitrogen by nitrogen bacteria are desirable qualities.

Public Open Spaces

The vital function of trees in the public open space is to create or reinforce the spaces.

Transparency at pedestrian's eye level permits the visual grasp of extensive areas of the town.

Evaluation of Trees According to the Activities

Activities Area

- | Activities Area | Criteria |
|----------------------------------|---|
| 1. Tot lots & Children Play Area | <ul style="list-style-type: none"> - Low Canopy - Deciduous - Evergreen - Flowering - Trees serve as a physical barrier between road and play area |
| 2. Schools | <ul style="list-style-type: none"> - Medium to Tall - Shady - Fragrant and Flowering |
| 3. Dispensary | <ul style="list-style-type: none"> - Evergreen/Deciduous - Shady - Trees having flowers thought out the year |
| 4. Community Centre | <ul style="list-style-type: none"> - Medium to Tall - Evergreen/Deciduous - Shady |
| 6. Parks (Recreational Spaces) | <ul style="list-style-type: none"> - Trees with different habits and characteristics, i.e., colour, form and texture - Evergreen or Deciduous - Tall, Flowering creating variety of spaces |
| 7. Cluster Court Yard | <ul style="list-style-type: none"> - Medium sized - Shady & fragrant and cut out the view - Deciduous to evergreen |

study it

8. Parking Areas

Evergreen, dense trees to provide shade and cut out the view

9. Buffer Green Belt

Evergreen, tall, hardy to serve as a buffer between commercial and residential area

Circulation

Highways : Large, evergreen double rows as per recommendation

- Peripheral Road:

Evergreen/Shady trees of uniform growth for pedestrians and to separate the two sectors.

- Shopping Streets :

Deciduous to mass flowering to provide beauty, confinement and identity to the road

- House connections

Trees with the varieties of forms, colour, texture, and for visual appreciation.

- Pedestrian paths :

Shady, Deciduous and flowering trees.

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