III) PROTECTING AND IMPROVING THE VEGETATION COVER

Protection and conservation of existing vegetation/trees and improving its quality and density is as important as planting and maintaining new saplings. Every citizen, all Government and non-Government organisations and local bodies have the responsibility to protect and preserve the existing flora of Chandigarh. A committee was constituted by the Secretary (Forests) to identify the dangerous trees and to suggest tree specific & location specific treatments and to furnish recommendation on dead, diseased dying & undernourished trees.

To protect and conserve the flora of Chandigarh, following steps would be taken on urgent basis:-

a) Replacement of dead, dying and diseased trees

It has been observed that in Chandigarh, along the roadside and in old parks some of the trees have died, whereas a few others are eaten by termites and are in the process of dying. These trees give an ugly look and are prone to uprooting and breaking during storms and attack/ spread of diseases etc. Therefore, as per the approval of the competent authority all such dead trees will be replaced with ornamental and pollution abating species. Irregular cutting of tree branches should be avoided as it increases the

possibility of insect infestation and disease infections at irregular cut. Pruning and other such operations should be carried out under the direct supervision of concerned Horticultural staff and the mechanized instruments like power chain saw, etc, should be used for such works, so as to avoid irregular cuts that lead to insect infestation. Fresh instructions will be issued to the departments responsible for cutting/pruning of trees for avoiding aforementioned damages to the trees.

b) Planting for future replacement

Along road sides and in old parks, some trees are aged and over matured. These trees are prone to development of hole in trunk, attack of diseases and uprooting during storms. Though these trees provide very good habitat for Parrots and hoopies but since the city forests where everything is being left to nature, is nearby, there will not be problem of habitat loss. It is essential to create either a second row of trees or under-planting under these over mature trees well in advance to avoid treeless or vacant situation at the time when these over-mature trees will be removed or uprooted naturally.

For this purpose, we will have a replacement policy governed by the following principles:-

1) Identification of trees which are likely to be replaced in the next ten years.

2) Replacement planting under these identified trees should be scheduled in such a manner that at the time of removal of old tree, new crop of trees is atleast 10 years old or crown of tree is developed enough to provide shade and mature enough to withstand various climatic and biotic pressures.
3) More emphasis should be given to species like *Pilkhan, Moulsari, Mahogany, Budhas Coconut, Haldu* etc. at the time of replacement planting.
4) In the areas where trees have been identified for replacement, the planting should be done with the same species to be replaced so as to avoid the change in the established and tested composition of vegetation and to maintain symmetry.
5) Along the roadside where miscellaneous avenue plantations were done in the past, as far as possible, replacement should be done with species like *Pilkhan, Moulsari, Mahogany Budhas Coconut, Haldu, Marorphali etc., as* these species are hardy, more efficient in pollution abating and suitable for roadside plantations.
6) Mixture of more than two species should be avoided in case of roadside avenue plantations. While doing replacement planting, tall saplings of 6 feet and above should be used so as to reduce establishment period and maintenance cost.

7) At the time of replacement planting, it should be ensured that sapling of same age group and same height are planted to provide an even look. Further, sufficient protection measures should be taken to avoid casualties, which normally results into gaps or uneven look to the avenue. In case of casualty, casualty replacement should be done with the sapling of similar height merging with that of other saplings of avenue.
8) Plantation of species like *Semul* and *Gulmohar* should be avoided in residential areas and roadside as these are known to cause allergies. So far as existing trees of these species are concerned, they will be covered under the replacement policy.
9) Planting of ornamental and flowering trees & shrubs will be taken up at the entry points of the city and other vintage points on major roads, in Lake Reserve Forests, Sukhna Choe Reserve Forests, Gardens, Parks, Leisure Valley etc. to increase its aesthetic richness and biodiversity. The flowering trees will be planted in groups to give mass effects when in bloom.

c) Selection of species to be planted under the overhead electric lines and telephone lines

It has been observed that the trees like *Pilkhan, Chukrasia* and *Bahera* which grows upto 40 feet height have been planted under electric lines which are hardly 15 feet above

ground level. These trees then require constant headback and heavy pruning and thereby giving non-aesthetic view to the road sides. The species like *Putranjiva roxburghii, Millettia, Moulsari (Mimusops elengi), Lagerstroemia species, Cassia javanica, Cassia nodosa, Barringtonia* etc. may be planted under the electric lines running parallel to roads or in parks and green belts. These species may be given beautiful shapes by light pruning only. Moreover, the species like *Putranjiva, Moulsari* and *Lagerstroemia* are having good and beautiful foliage and good capacity to absorb the air pollutants including dust.

d) Removal of Lantana, Parthenium Grass and Amarbel (Cuscuta)

Besides being allergic, lantana and parthenium grass are the weeds which adversely affect the growth of indigenous species. These are fast spreading and invade new areas and prevent the coming up of local flora of the region, if allowed to grow unchecked. It has adverse impact on the biodiversity as it kills all kind of undergrowth. Amarbel which is a parasite has also invaded a few trees in Chandigarh. Children out of fun throw it from one tree to another thereby accelerating its spread. It is a parasite which covers the whole foliage of tree and starves it of light and air. All greening agencies have been asked to remove these weeds at least twice a year to ensure proper growth of

indigenous flora. From forest areas, lantana has already been removed by the Forest Department. The parthenium appears only on unattended and uncultivated areas along roadsides. Instructions have been given to Horticulture Wings of both Municipal Corporation and Engineering Departments to keep their respective areas clear of this weed.

e) Composting/Vermicomposting to stop burning of leaves

It has generally been seen that the dried leaves and other waste materials are burnt on road sides and also under the trees. Burning not only causes air pollution but also damages the live tree and affects its growth. All greening agencies and local bodies should ensure that no burning of dry leaves and other wastes takes place in open and particularly under the tree. These leaves may be utilised to make compost/vermi compost manure by mixing cow dung with leaves and putting them into big pits.

The Departments may utilize the compost/vermi compost manure for their nurseries and plantations for better and healthy growth of saplings.

Municipal Corporation may make efforts to introduce composting in Nurseries and various other sites. Specific allocation of these composting sites may be done by the Departments/ Municipal Corporation on roadsides for collection and dumping of dry leaves in those pits. All

institutions and households are requested to make compost/vermi compost pit at their premises to convert dry leaves into compost or vermi compost which may be very useful for their kitchen garden. Municipal Corporation and Engineering Department will take strict action against officials/ individuals responsible for burning of leaves.

f) Control of Pest attack on Trees

Sustained & concerted efforts of various agencies under the guidance of PAU advisory service have been successful in combating the epidemic status of Mango mealy bug in U.T. Chandigarh, thus preventing a serious threat to a wide range of flora. Similarly, efforts are on to prevent Arjun trees on 'Dakshin Marg' that are infested with stem borer adopting PAU technology. The plant protection work against the perennial pests as mentioned earlier will be continued and monitored from time to time. Municipal Corporation and Engineering Department should complete the process of wrapping alkathene around tree trunk by 15th of December every year as this is the time for mealy bug nymphs to crawl up the tree. Similarly for stem borer, (particularly for Arjun avenues) the solution of methyl parathion (4 ml. to a litre of water) should be injected into the holes (made by insects in the tree trunk) with the help of syringe and the holes be plugged with mud. This will ensure the killing of stem borer (Inderbela sp.).

Regarding trees infested with termites the following treatment method suggested by the scientists of Forests Research Institute should be followed to ensure growth & vitality of the tree.

1. Control of termites attacking standing trees (bark feeding termites)

In the areas of high termite activity, where the damage is very extensive and is likely to affect the growth, chemical treatment may be carried out as follows :-

i) **Soil treatment**: One litre of insecticidal solution of 0.2% Chlorpyriphos 20 EC may be applied by digging a trench encircling the base of the tree.

ii) **Bark treatment**: To prevent the termite attack on the bark or the outer portion of the tree trunk, brush painting with the insecticide may be done after scrapping off the earthen plaster or galleries.

Formula for preparation of the insecticidal solution:

$$\text{Actual insecticide required} = \frac{\text{Solution required X \% (Percentage)}}{\text{Formulation}}$$

Ready Recknor for making upto 100 litres of diluted spray of desired strength:

% of actual dose required	Chlorpyriphos 20EC	Chlorpyriphos 50EC
0.01	50 ml	20 ml
0.02	100 ml	40 ml
0.05	250 ml	100 ml
0.1	500 ml	200 ml
0.2	1000 ml	400 ml

Note: For example, if we require 0.2% solution of Chlorpyriphos 20 EC, then mix one liter of the insecticide in 100 liters.

The quantity required varies with the size of the mound. The following height dosage relationship for effective control of mound building termites has been given by Roonwal, 1985.

Mound height	**Dosage of insecticide solution**
90 centimeter	4.5 litres
1.20 meter	23 litres
1.50 meter	45 litres
1.80 meter	82 litres
2.10 meter	123 litres

It takes about a week for the complete killing of the entire mound colony. Make 2 or 3 large holes in the mound and pour in the liquid by means of a bucket and a large mouthed funnel.

Another most effective method is by poisoning the mounds with Aluminium Phosphoric tables. Two tablets should be placed in 1 metre mound and close all the openings with wet mud. The termites will die due to fumigant action (Mound poisoning) (Thakur, 1990).

g) Removal of concreting/tiling around the tree trunk and removal of Kiosks, advertisement boards etc. from the tree trunks

Compaction of soil, concreting and tiling around tree trunk adversely affects its growth and life. It also reduces/ stops percolation of rain water into the sub soil and stops proper soil aeration of roots of the trees. This leads to tremendous damage to the trees. All greening agencies should leave a space of 6 ft. x 6 ft. around the tree trunk to ensure proper growth and long life in addition to recharging of underground water aquifer. All concerned Departments have already removed tiles/ concrete around the trees. It has been decided to leave sufficient breathing space around tree trunks while doing pavements on road berms, parking areas etc.

Individuals and commercial organisations are in the habit of displaying the kiosks and advertisement plates on the tree trunk using iron nails. This is injurious to the tree. All concerned Departments and Greening Agencies should take strict action against such offenders.

h) Removal of lights (bulbs & tubes) from trees

It has been observed that people decorate the trees with lights (electric bulbs & tubes) on occasions of marriages or other functions. Few Petrol Pump owners are also in the habit of loading the trees in front of Petrol pumps with decorative electric lights. This practice is very harmful to the health of trees & vegetation. It disturbs the life cycle of tree and hampers its growth & vitality. Petrol pump owners and other citizens of Chandigarh are requested not to resort to such activities. Strict action will be taken by the Horticulture Wing of Engineering Department against the persons responsible for fixing lights on trees & shrubs.

i) Recharging of Ground Water Aquifers

It has been observed that the water table is going down in Chandigarh. This is primarily due to reduction in percolation of rain water. Rain water is lost due to surface run off as most of area is tiled or concreted in the form of parking, pavements, road berms etc. To recharge underground water aquifers, it is essential to reduce/ minimise surface run off. To achieve this, perforated tiles may be used in Parking areas & road berms wherever possible. Tiles around tree trunks may be removed. Percolation tanks should be made and N-Choe may be depebbled in stretches so as to increase water percolation.

j) Mulching of leaves for protection of saplings

Dry & wet straw grasses and leaves should be used for mulching over the soil around tree/sapling stem to protect the roots & for conservation of moisture. This will not only reduces the water requirement of the sapling/tree but also improves the soil texture & fertility to ensure better survival rate and healthy growth of the tree. The areas where such practices are followed will be under constant vigil against white ant attack.

k) Transplantation of Trees

To provide basic amenities to the people and for the development of the city, at times, it becomes necessary to remove few trees. Conservation of nature and developmental activities should go hand in hand in such a manner that development of the Capital City goes unhampered with minimum damage to the nature. To ensure sustained development, it has become necessary that existing vegetation is saved as far as possible.

The important trees like *Ficus species, Neem, Mulberry and Shisham* being felled on account of various developmental activities can be saved by transplanting them to other suitable site. In Delhi & Chandigarh, trees upto thirty years of age have been transplanted with a success rate of over 70%. Forest Department of Chandigarh Administration

will transplant trees if required. The transplantation of these trees will ensure utilisation of these well grown trees to the maximum extent in combating pollution and delivering other environmental benefits.

l) Restoration of Biodiversity and its Conservation

For continued survival of species and natural communities which are important for the welfare of human beings, all levels of biodiversity are required. In Chandigarh City, there is more focus on ornamental and exotic species of trees and plants and the indigenous plant species are either neglected or get the back seat which may have adverse impact on the biodiversity of the region. Chandigarh is a small Union Territory with limited land area for conservation of bio-diversity. The introduction and increase of exotic species will drive the local indigenous species to extinction. Most of the exotic species are flowering in nature, having comparatively less life span and are less effective in mitigating the ill effects of air pollutants. The indigenous species on the other hand are hardy, have long life span and are more effective in pollution abatement and require little care and water. Chandigarh being a modern and beautiful City should represent a proper blend of indigenous and exotic species complementary to each other. The traditional plants like *Peepal, Bargad, Neem & Mango* find their closest cultural practices and spiritual links. Each tree/plant species

has value of its own and has a right to exist. Extinction of one species is likely to destabilise the entire bio-community leading to the extinction of other species.

In Chandigarh City, *Chukrassia* tree which is not endemic to the City is planted on more than six roads and in almost all parks and green belts whereas the most beneficial indigenous trees like *Neem, Mango & Peepal* are very few in number. So we should lay more emphasis on planting of *Neem, Peepal, Mango, Jamun & Arjun* tree to avoid a void in the natural eco-system. However, for selection of site, emphasis will be given to exploit the maximum benefit of the nature of their growth.

To restore the past diversity and enrich the original flora and fauna, efforts will be made to plant the natural species like *Peepal, Pilkhan, Neem, Mango, Jamun, Shisham, Bargad, Gular, Jungle Jalebi, Kikar,Khair* etc. A judicious combination of evergreen trees & flowering trees will enhance the aesthetics and biodiversity of city and its surroundings. The natural forest areas like Reserve Forests, Sukhna Wildlife Sanctuary and Leisure Valley should be developed as multi-storeyed forests to act as the store house of bio-diversity. This will also increase the micro-organisms including micro-flora responsible for soil fertility.