



## 17. ECOLOGY AND ENVIRONMENT

### 17.1 INTRODUCTION

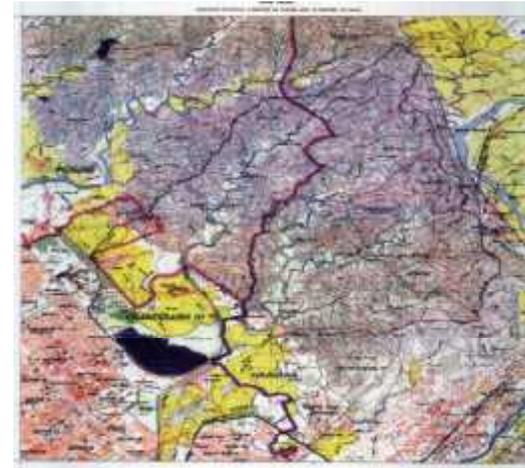
As already detailed in Chapter 4, the ecological and aesthetic values of Chandigarh's location were major considerations in selection of the site and planning of Chandigarh. While the Shivalik Hills to the north provided a visually attractive backdrop to the monumental Capitol Complex, the two choes (seasonal rivulets) on either side defined the eastern and western boundaries of the Chandigarh Plan. The N Choe going through the middle of the site was converted into a continuous green belt (the Leisure Valley) and the north to south slope provided natural drainage. Subsequently, it was decided to dam the Sukhna Choe to provide Chandigarh with its much loved lake.

Both the Chandigarh Plan and the 'Edict of Chandigarh' strove to preserve the city's proximity with nature by prohibiting any development to the North of the city, leaving the hills ecologically and visually undisturbed. The Periphery Control Act was similarly meant to maintain a clear rural urban dichotomy and prevent unregulated urban development within a radius of 16 kms around the city.

- **Objectives of ecological planning for the Union Territory of Chandigarh**
  - Protecting the ecological integrity of Sukhna Lake catchment and the wildlife sanctuary
  - Protection & conservation of Choes
  - Increasing the green cover and its diversity
  - Minimizing noise & air pollution

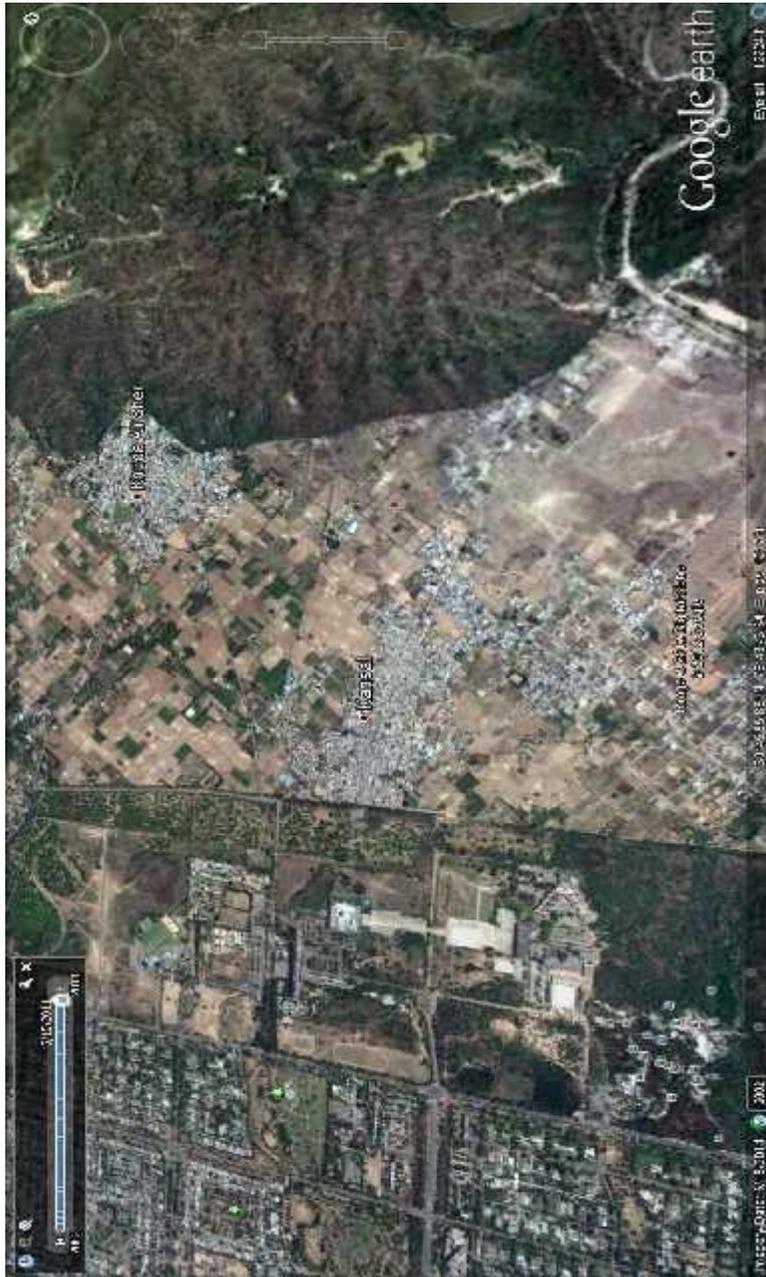
### 17.2 PROTECTING SUKHNA LAKE'S CATCHMENT IN THE ECOLOGICALLY FRAGILE SHIVALIK HILLS

Realizing the grave threat posed to the Sukhna Lake by soil erosion from the degraded Shivalik Hills, in 1963, the erstwhile Punjab Government acquired 2,598.42 ha of hilly catchment area of the lake from different villages for undertaking soil and moisture conservation works.



Despite conservation measures taken, the first major ecological problem encountered by the city was the high rate of siltation of the lake. 63% of the lake's storage capacity had already been eaten away by silt till 1974. After the reorganization of Punjab in 1966, the catchment got divided between the UT of Chandigarh and the states of Punjab and Haryana. Out of the lake's total catchment area of 4207 hectares, 3312 ha (66% of the catchment area) is in the hills out of which 770 ha now falls in Haryana. Most of the remaining 895 ha of the catchment area in the plains is under agricultural use and habitations and falls partly in Punjab (Kansal village), Haryana (Saketri Village) and the UT of Chandigarh (Kaimbwala village, a part of the Capitol Complex and the Rock Garden).

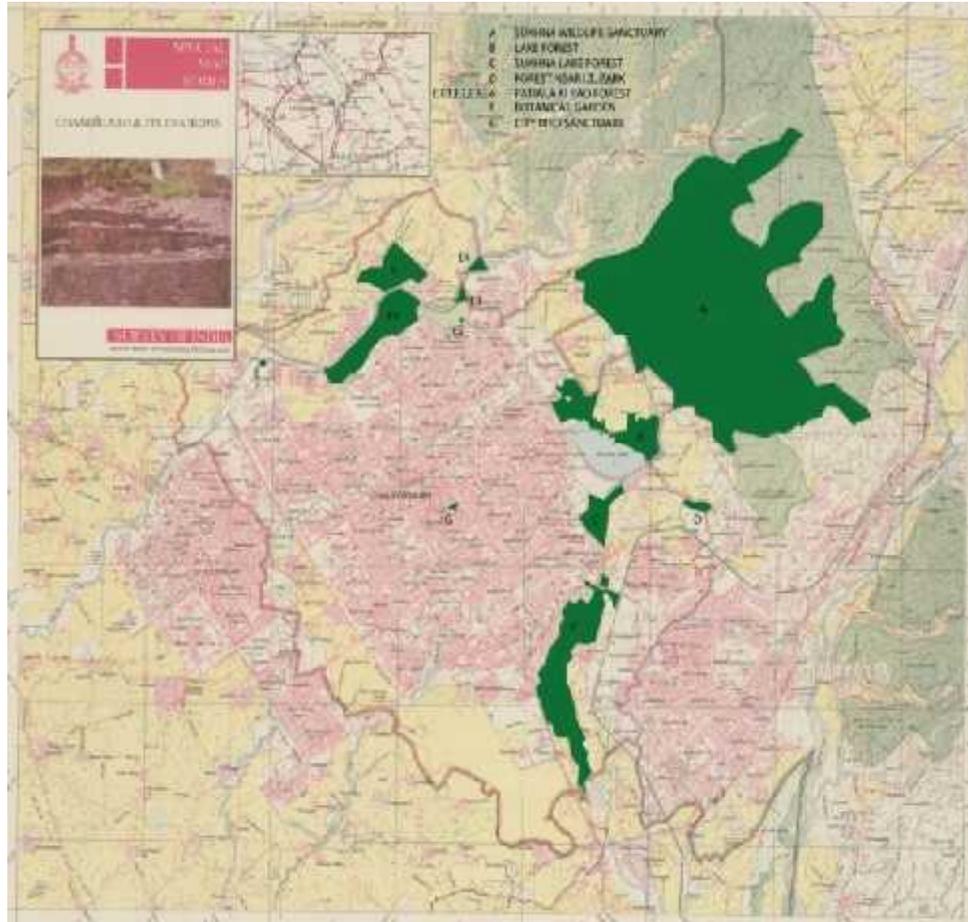
*(Source: Management Plan for Sukhna Wildlife Sanctuary and Survey of India map of the Lake's catchment).*



THE CAPITOL COMPLEX AND THE AREA TO ITS NORTH (GOOGLE MAP)



LOCATION OF SUKHNA WILD LIFE SANCTUARY ON THE NORTH OF CHANDIGARH



FOREST AREAS IN CHANDIGARH



SUKHNA LAKE AND THE RESERVE FORESTS IN THE BACKDROP



SUKHNA LAKE AND THE FORESTS IN THE BACKDROP



CONCERN - THE DRYING UP OF THE SUKHNA LAKE



EMERGING THREATS TO THE NATURAL SETTING. STRICT MONITORING OF DEVELOPMENTS ON THE NORTH IS ESSENTIAL.



PROBLEM OF SILTATION IN THE LAKE



Examination of the catchment area in the mid 1970s revealed that the highest rate of siltation was taking place in the area adjoining Sukhomajri Village in Haryana due to unregulated grazing in the hills and breaking of hilly land for cultivation. This resulted in the Central Soil & Water Conservation Research & Training Institute taking up an operational research project in the Sukhna catchment from the mid-1970s which led to the famous pilot project of social fencing in Sukhomajri Village. With grazing voluntarily brought under control by the villagers, combined with extensive soil and water conservation measures undertaken under the operational research project, the rate of siltation in the catchment came down dramatically.

Chandigarh's forest department has subsequently continued intensive soil and water conservation measures including effective closure, large scale plantation, construction of silt detention dams and masonry check dams supported by vegetative conservation measures. These measures have further reduced the siltation rate of the lake to less than 5 tonnes/ hectare/ year and the overall tree density has increased from 162 to 450 trees per hectare. However, this seems to have also decreased the surface water runoff into the lake.

In 1998, the 2598.42 ha hilly area acquired in the lake's catchment was first notified as a Reserve Forest (RF) and then as a wildlife sanctuary under the Wildlife Protection Act, 1972 with effect from 16.03.1998. This ensured a still higher level of protection to this area for which a separate Management Plan has been prepared. Another 456.31 ha was notified as Reserve Forest in the UT consisting of the Sukhna Choe Reserve Forest and Lake Reserve Forest. An additional 23.29 ha of land along Patiala Ki Rao was notified as RF in 1961. With about 9 ha having been diverted for non-forest purposes, the total RF area in the UT (excluding the sanctuary area) at present is 470.38 ha. (source: *Working Plan, UT Forest Division and Management Plan for the wildlife sanctuary*). Another 183.14 ha adjoining the Patiali –ki-Rao, Sukhna Choe and lake RFs is recorded as Unclassified Forest.

### 17.3 SUKHNA WILDLIFE SANCTUARY

Sukhna Wildlife Sanctuary spread over an area of 2598.42 ha is located in the North –East of the Sukhna Lake and forms part of Sukhna lake's catchment area falling in the Shivalik Hills. The Shivalik hills geologically unstable and thus are highly prone to soil erosion during rains. The soil in the Shivalik is sandy, embedded with pockets of clay which is highly susceptible to erosion by surface run off. Concerted measures taken towards prevention of erosion /silt into the Sukhna Lake have resulted in a thick forest cover and rich biodiversity of the area. Approximately 10 % of the perimeter of the sanctuary abuts the Chandigarh UT, the major part being along the states of Punjab and Haryana.

193 water bodies have been built in the Sukhna Wildlife Sanctuary which support wildlife and migratory birds that flock to this sanctuary.

The first wildlife census carried out in the Sukhna Wildlife Sanctuary in December 2010 found nine species of mammals and 63 species of birds including two species of Schedule I, two in Schedule II, three in Schedule III and one in the Schedule IV category of the Wildlife Protection Act.

Nine species of mammals include Leopard, Sambar, Chitah, Wild Boar, Indian Porcupine, Indian Pangolian, Blacknaped Hare, Golden Jackal and Grey Langur. The presence of predators such as the leopard, which requires enough prey for its sustenance, suggests the importance of Sukhna and its rich biodiversity. Prominent among the birds are Peacock, Red Jungle Fowl, Grey Partridge, Cuckoo, Night Jar, Golden Oriole, Kingfisher, Swift, Hoopoe, Hornbill, Barbet, Woodpecker, Roller, Barn Owl, Parrot, Dove, Jacana, Plover, Coot, Hawk, Goose, Swan, Duck, Grebe, Black Drongo, Tree Pie, Jungle Crow, Bulbul, Hill Myna, Koel, Bee-eater, Common Myna etc.



Entrance to the Sukhna Wildlife Sanctuary



CATCHMENT AREA OF THE SUKHNA LAKE



SUKHNA WILDLIFE SANCTUARY



#### 17.4 THE CHOES (SEASONAL RIVULETS)

Both Sukhna Choe and Patiali ki Rao, as well as the N choe flowing through the city (now converted into the Leisure Valley) perform important ecological functions which have not received the same attention as the problem of siltation of the lake. All the three choes originate in the Shivalik Hills and provide seasonal drainage for the surface water run off from their catchments during the monsoons. Their sandy beds also recharge the deep sub-soil water aquifers which provide Chandigarh about 20% of its water supply. Many of Chandigarh's tube wells are located in the beds of these choes.

Unfortunately, several insensitive developments are taking place next to and within the choe beds both in the UT and Punjab. Untreated sewerage and solid waste of Naya Gaon in Punjab and Khuda Lahora and Khuda Jassu in the UT is being thrown into Patiali Ki Rao. The same is happening in parts of the Sukhna Choe in the UT and Punjab and even the N Choe going through Chandigarh's southern sectors has not been spared. Besides destroying the local ecology and becoming a public health hazard, it is likely to pollute the sub-soil water. Rampant unregulated sand mining in Patiali Ki Rao is also threatening its water recharging capacity. In contrast, the parts of Sukhna Choe and Patiali Ki Rao with notified Reserve Forests along their sides are in much better condition with lush vegetation. These Choes suffer from :

- i) High degree of man made encroachments.
- ii) High degree of water/environment pollution.
- iii) Discharge of untreated sullage in the choe bed.
- iv) Mushroom development of slums along the river bed.
- v) Low availability of fresh water.

#### 17.5 SECURING & ENHANCING THE VALUE OF EXISTING GREEN COVER

Open spaces in the Chandigarh Master Plan were meant to provide a continuous stretch of green spaces for pedestrians and cyclists to walk/cycle across the city in safety. The Forest Department has been preparing an annual 'Greening Action Plan' synergizing the efforts of different stakeholders like the, Municipal Corporation, Engineering Department, NGOs etc. Due to these efforts the tree cover in the UT is placed at 8.93% (10 sq km) of the geographical area.

The forest & tree cover of the UT of Chandigarh has increased consistently over the last decade and as per the State of Forest Report 2011, the total green cover (forest cover + tree cover) of UT, Chandigarh is placed at 23.65% of its geographical area. Recognizing these efforts, the Union Territory of Chandigarh was awarded the 'Indira Priyadarshini Vriksha Mitra (IPVM) Award-2010' under the UT category.



THE FOREST & TREE COVER OF CHANDIGARH



PATIALI KI RAO



ENCROACHMENTS WITHIN THE NATURAL RIVULETS



POLLUTION INTO PATIALI KI RAO



POLLUTION INTO PATIALI KI RAO



ENCROACHMENT INTO THE NATURAL RIVULETS



## 17.6 Air and Noise Pollution

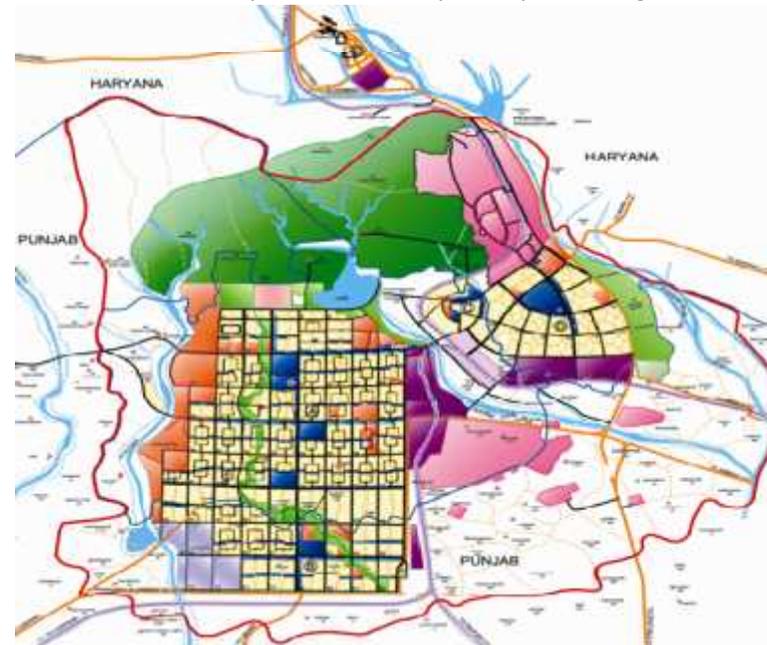
The entire Union Territory of Chandigarh was declared an 'Air Pollution Control Area' under the Air (Prevention & Control of Pollution) Act, 1981 on 1<sup>st</sup> February, 1988 by the Ministry of Environment & Forests. Earlier, the Central Pollution Control Board was enforcing the Environmental Acts/Rules in Chandigarh. After 1991, the Chandigarh Pollution Control Committee became responsible for performing the functions of State Pollution Control Board in Chandigarh. The Ministry of Environment & Forests has notified National Ambient Air Quality Standards for various pollutants and the Chandigarh Pollution Control Committee monitors ambient air quality at five different locations and implements various Environmental Acts/Rules in Chandigarh. The ambient air quality of Chandigarh is now under pressure. Respirable suspended particulate matter in the city has started crossing permissible limits. Studies have shown that the air quality of Chandigarh is largely impacted by vehicular pollution.. The other major contributors to air pollution are industries, burning of leaves from trees & gardens and the use of diesel generator sets in certain areas.

In addition to the air pollution, the city is also facing problems in terms of noise pollution. Despite the care taken to minimize noise pollution during Chandigarh's planning through measures such as restricting the movement of heavy vehicles on internal roads, separating industrial area with green belt and dense vegetation cover, etc., most of the areas now exceed the noise pollution limits. The most prominent sources of noise in the city are traffic, commercial and industrial activities, celebration of festivals, diesel generators, construction activities, etc.

A road length of over 2000 kms. and over six lakh vehicles contribute a major share of noise pollution to Chandigarh's environment. The noise levels notified for different categories of area in Chandigarh are shown **Annexure-A1**.

## • EMERGING THREATS TO THE NORTH OF CHANDIGARH

The Edict of Chandigarh prohibits any urban development to the north of the Capitol Complex. This was reiterated by the Chandigarh Urban Complex Plan prepared in 1977 by the Co-ordination Committee. This plan clearly indicates the area of Kansal Village (falling in Punjab) north of the Capitol complex as a "No Development Area'. Although Chandigarh itself has refrained from undertaking any development to the north of the city, both Punjab and Haryana have now planned intensive urbanization in this belt, held almost sacred by the original planners as well as the city's residents, in total violation of earlier decisions. Besides marring the aesthetic value of the undisturbed hills crowning all Chandigarh's north-south roads, and mocking the conceptual basis of Chandigarh's original Plan, these contradictory developments in the pipeline will jeopardise the Capitol Complex's sanctity and make the efforts futile to preserve the city's unique heritage.



Chandigarh Urban Complex Plan



Due to large scale urban development taken up by the States of Punjab and Haryana, to the city's north falling in the catchment of the Sukhna Lake, such development will pose a long term threat to Chandigarh's already threatened lake.

The notified Development Plan of NAC, Naya Gaon 2021 falling in Punjab provides that one kilometer zone from the north-eastern edge of the Secretariat building shall be a low rise zone. Beyond that, the building height can be 1.5 times the width of the road in front of the building plus the width of the front setback.

Based on these norms, a group housing-cum-retail complex on a site of 53.39 acres in the vicinity of the Capitol Complex, and almost adjoining the wildlife sanctuary in Kansal Village, has been designed. With a planned built up area of 7,01,370 sq. m, the project envisions building 28 high rise towers ranging from 12 to 35 floors implying minimum heights of 120 to 350 feet. Besides overshadowing Le Corbusier's Capitol Complex, enormous volume of built space generated by these tall buildings and the large increase in traffic on the road just outside the sanctuary will cause serious disturbance to wildlife, flora and fauna.

Such a project will also have an adverse impact on Chandigarh's ecology and infrastructure in terms of air and noise pollution, high extraction of ground water, lowering the ground water table, waste water and solid waste management, besides, generating high volume of traffic. In addition, the development is likely to pose a serious threat to wildlife.

## 17.7 PROPOSALS OF THE CHANDIGARH MASTER PLAN 2031

To deal with above problems, the Chandigarh Master Plan 2031 proposes following interventions :

### a. **Securing the entire catchment of the Sukhna lake**

In order to preserve the Sukhna Lake, it will be appropriate that entire catchment area of Sukhna Lake is brought under Regulation

and Control to secure it. At present, only the hilly part of the lake's catchment area has been notified as the wildlife sanctuary. However, area under urbanisation forming lower part of the catchment has not been strictly regulated. This needs to be done on a priority basis in order to minimize its adverse impact to prevent flow of sediment or polluted water into the lake. Any change in the landuse in this area also needs to be strictly regulated in order to preserve the sanctity and basic character of the area. Development in the immediate vicinity of the Wildlife Sanctuary should not be permitted which contravenes the objectives of wildlife conservation. The Catchment Area of Sukhna Lake consists of 4207 hectares, out of which 3312 ha is hilly and forested. The remaining 895 ha of area is comprised of villages Kansal (Punjab) Saketri (Haryana) and the UT of Chandigarh (Kaimbwala village, part of the Capitol Complex and the Rock Garden.

### b. **Notifying an Eco-sensitive Zone (ESZ) around the Wild life Sanctuary**

In order to protect the environs of Wildlife Sanctuary, the area around it should be identified and declared as Eco-Sensitive Zone in consultation and collaboration with the governments of Punjab and Haryana. Only ecologically compatible landuses and activities shall be permitted in this zone as per the guidelines issued by the Ministry of Environment and Forest. Accordingly, plans for the area falling in Kansal Village in the Development Plan of NAC, Naya Gaon 2021, and the Mansa Devi Urban Complex in Haryana should be reviewed and revised to conform to the requirements specified for the ESZ. The Chandigarh Administration has already finalised the draft notification of Eco Sensitive Zone of Sukhna Wildlife Sanctuary for the area falling in UT, Chandigarh's jurisdiction and submitted to the Ministry of Environment & Forests, Government of India, for notification. The Chandigarh Administration has determined a width of Eco Sensitive Zone ranging from 2.0 to 2.75 km upto Uttar Marg on southern side of the Sukhna Wildlife Sanctuary so as to include Sukhna Lake & its catchment area.



### c. Protecting the Choes

Considering the role and importance of choes in the context of overall ecology of the city and its environs, it is recommended that -

- the flood plains and the beds of the two choes on either side of the sectoral grid must be demarcated and protected from any kind of construction, sand mining and dumping of sewage and solid waste in them to maintain their ecological integrity and natural drainage function.
- The Reserve Forest area along both the Sukhna and Patiala Ki Rao Choes should be expanded by notifying the unclassified forest land adjoining them as reserve forests. The feasibility of notifying the choe beds, consisting of revenue land as reserve or protected forests should be explored in order to protect this area from unauthorized construction. This would help in not only increasing the UT's Forest cover but will also provide a corridor for wildlife connecting different forest patches which are presently not integrated.
- Alternatively, the demarcated choe beds and, where available, 30 meters of land on their sides should be declared as Eco-Sensitive Zones under the Environment Protection Act for prohibiting uses/activities considered detrimental to their ecological functions and regulated as per MoEF guidelines .
- Decentralized sewerage treatment plants must be set up for the existing villages and other developments along the choes on priority for preventing pollution of subsoil water by untreated sewage.
- Channelizing the choes and stone facing their sides must be reviewed and revoked. Stone facing may be undertaken only in selected/identified patches .

- As choes are ecological entities cutting across state or administrative boundaries, efforts must be coordinated with the state governments of Punjab and Haryana to adopt similar measures for the parts of the choes passing through their territories.
- e. **Securing & Enhancing the Value of Existing Green/Open Spaces**
- Surviving old trees and groves in the UT should be identified and protected.
  - All existing Zoning Plans should be reviewed and revised in order to ensure that no future construction of community facilities in the planned open spaces are permitted which interfere with pedestrian movement, availability of green spaces and natural drainage.
- f. **Air and Noise Pollution**
- For tackling the menace of air and noise pollution and to minimize the same to bring it within the prescribed norms, it is proposed that time bound switchover to use of CNG by public transport vehicles and giving priority to developing footpaths and cycle tracks to reduce the dependence on motorized vehicles should be promoted on priority. A Comprehensive Urban Air Quality Management strategy may be formulated based on emission inventory, dispersion models and urban policy inventory. The proposed Multi-Modal Mobility Plan with Mass Rapid Public Transport linking the city to neighbouring towns should be put in place on priority in order to reduce the air and noise pollution.



## 17.8 WILD LIFE CORRIDOR

The Lake Reserve Forest and Wild Life Sanctuary are separated by agricultural land. The growing wildlife population in the Sanctuary has often resulted in animals straying into nearby settlements in Kishangarh and Khuda Ali Sher in the Union Territory and in Kansal in Punjab leading to number of casualties. In order to overcome this problem, the UT administration has launched a massive afforestation drive of the agricultural land separating the two forests in order to create a Wildlife Corridor between the Reserve Forest area and the Regulator End of the Sukhna Lake on a stretch spanning nearly 1.4 km. The programme is aimed at preventing unauthorized construction taking place in the area and to preserve and protect the wildlife in the Sanctuary.

The proposed Wildlife Corridor will help in converting the agriculture use of land into afforestation and would act as the connector between the Sanctuary and the Lake Reserve Forest. For preserving the area under corridor, it should be declared as a 'No Development Zone'.

### Plantation in the newly acquired land at village Kaimbwala

On the recently acquired 50 acre land at village Kaimbwala, the Forest Department has carried out thematic plantation of fruit bearing tree species in approximately 48 acre area. The rest of the two acre area, which already has the vegetation is being maintained as such. A massive plantation drive was organized by the Department of Forests, UT, on the occasion of the World Environment Day-2011 to take up the plantation on the newly acquired land. Tall saplings of following fruit bearing species have been planted - Mango, Jamun, Guava, Shatoot, Neem, Pipal, Pilkhan, Dhek, Kankankchampa, Arjun, Imli, Amaltas etc. Plantation of fruit bearing species will improve the Quality and Bio- Diversity of the vegetation in the Lake Reserve Forest behind Sukhna Lake. Availability of the food to the wildlife and monkeys will be ensured by this plantation.



THEMATIC PLANTATION IN THE NEWLY ACQUIRED LAND FOR THE WILD LIFE AT VILLAGE KAIMBWALA