ENVIS CENTRE, CHANDIGARH
NewsLetter
Paryavaran - Patra
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Chandigarh State of Environment

Lakes of Chandigarh

1. Fresh water and lakes

From the total water available, around the world, only 2.50% is fresh, which is available to humans in different forms i.e., surface water, groundwater, glaciers and ice caps (as shown in Figure 1). Among these fresh water sources, the surface water is one of the most exploited sources of fresh water. It fulfils the various domestic, industrial and agricultural needs of the mankind. The percentage distribution of various resources of surface water is ground ice: 69%, lakes: 21% and others such as, rivers and ponds: 10%. Therefore, it can be implied that lakes are the largest source of surface water that is most easily accessible to the living beings and hence, this newsletter is designed to discuss the status-quo of the lakes of Chandigarh.

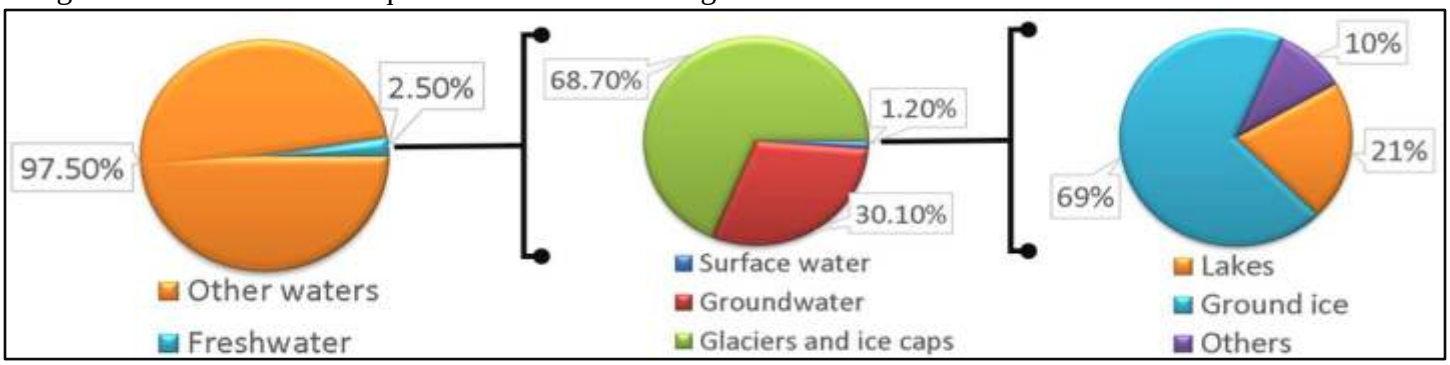

Figure 1 .Global distribution of fresh water

2. Lakes of Chandigarh

Chandigarh is the capital city of two prominent states of India i.e., Punjab and Haryana. Resources of surface water in Chandigarh comprise of Choes and lakes. Currently, there are five Choes i.e., 1. Sukhna Choe; 2. Patiala Ki Rao Chow; 3. Attawa Choe; 4. Baltanna Choe, and 5. Faida Chow. In case of lakes, there are three of them i.e., 1. Sukhna Lake;2. Dhanas Lake; and 3. New Lake. The geographical locations of these three lakes and their other details are given in Figure 2 and Table 1, respectively.

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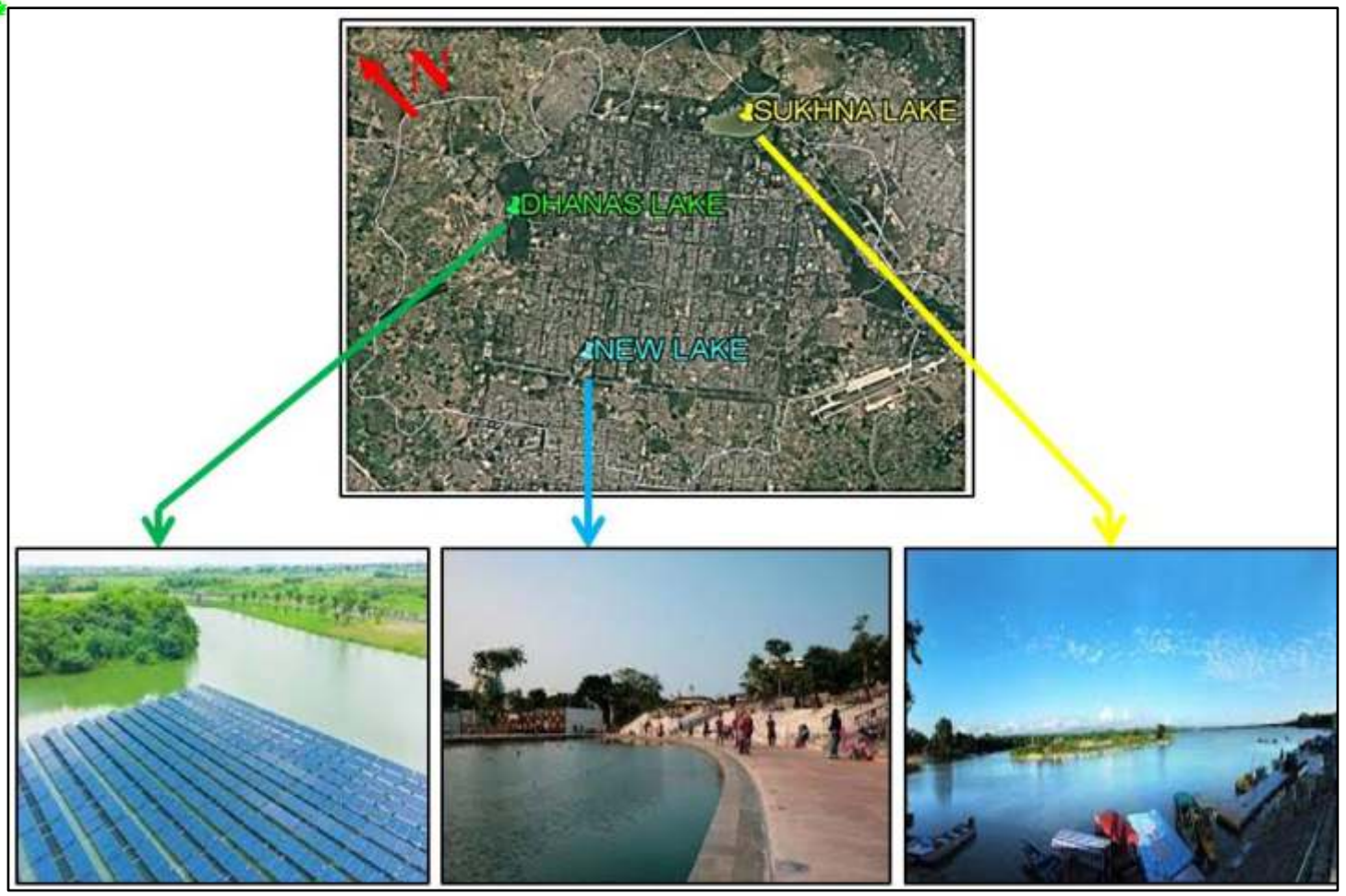

Figure 2 .Geographical location of the lakes of Chandigarh

Table 1 .Details of the lakes of Chandigarh

S.No.	Details	Sukhna Lake	Dhanas Lake	New Lake
1	Coordinates	30.7421° N, 76.8188° E	30.7659° N, 76.7570° E	30.7421° N, 76.8188° E
2	Area (km^2)	1.98	0.06	0.01
3	Location	Sector 1	Sector 38	Sector 42

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3. Tourism and Lakes of Chandigarh

In "The City Beautiful" the tourists love to visit various destinations such as, parks, urban forests, nearby hill stations etc. However, among these tourist destinations, the three lakes of the city, are the most famous spots among the tourists. The lakes of Chandigarh are visited by tourists to enjoy the scenic and surreal beauty of the city. Moreover, on the lakes, there are several other recreational activities that tourists can enjoy, as mentioned in Table 2.

Table 2 List of tourist attractions at different lakes of Chandigarh

S.No.	Recreational activity	Sukhna Lake	Dhanas Lake	New Lake
1	Scenic beauty	✓	✓	✓
2	Migratory birds	✓	✓	-
3	Water entertainments	✓	-	-
4	Water sports	✓	-	-
5	Festive celebrations	-	-	✓

All the three lakes are attraction for such tourists who want to take a break from concrete-jungles and enjoy some quite time in tranquil environment. Dhanas Lake is located in the outskirts of the city and hence, tourists can enjoy quality quiet time at this spot. While enjoying the pristine environment of Sukhna Lake, tourists may also visit nearby locations such as Golf course, Nek Chand's Rock Garden, Chandigarh Bird Park and capture photographs of the exotic bird species. Sukhna Lake also offers several recreational water entertainments and sports such as, boating and rowing, respectively. New Lake, as the name suggests, is the youngest lake of Chandigarh and also famous one as two major festivals i.e., Chatt Pooja and Ganesh Pooja, are celebrated in this lake.

4. Water quality of Chandigarh's lakes

Lakes provide a number of tangible and intangible benefits to the citizens of Chandigarh. Therefore, local authorities are inclined towards maintaining the water quality of the lakes and for this purposes regular samples are collected and analyzed by the Chandigarh Pollution Control Committee (CPCC). The analysis of the same data for the three lakes, collected during 2016 to 2020, are presented in the form of the three quarters i.e., Q1, Q2 and Q3 comprising months Q1. January, February, March, April; Q2. May June, July and August; Q3. September, October, November and December, as shown in Figure 3.

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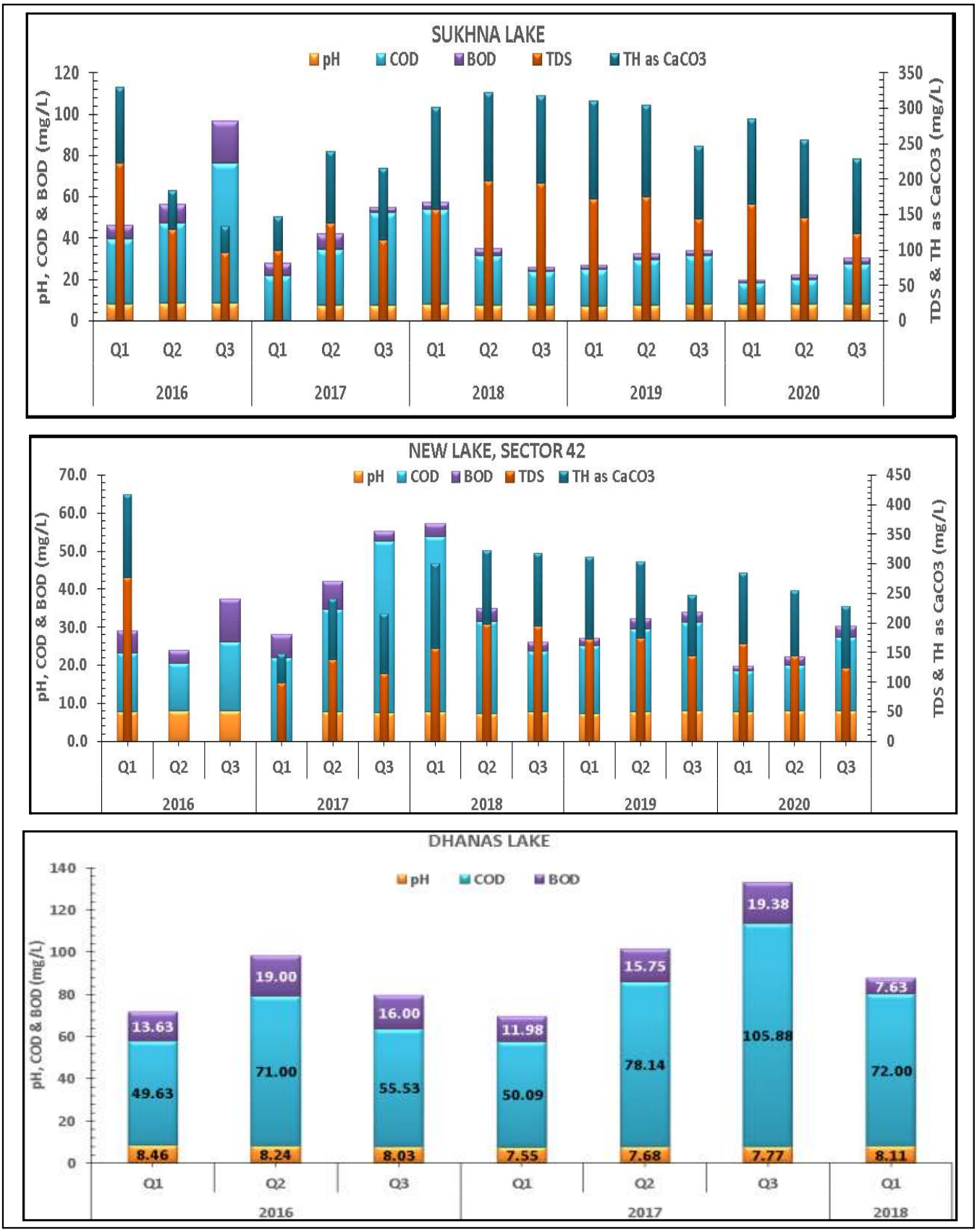

Figure 3. Water quality of the three lakes of Chandigarh (source: CPCC)

From Figure 3, it can be illustrated that since 2016, significant variations were not observed in the pH of all the lakes. However, the COD and BOD of Sukhna Lake were observed to decrease from 2016 to 2020. In case of New Lake, the COD increased from 2016 to 2017, however, after that it was observed to decrease consistently. Similar trend was reported in case of the BOD of New Lake. Rest of the parameters i.e., TDS and TH, did not show significant changes during the period of 2016 to 2020. Among the various sources, the major ones that contribute in reducing the quality of lake's water are,1. Run-off from agricultural fields. 2. Silt deposition, 3. Eutrophication, 4. Organic contamination duringfestivals. In this newsletter, Section 5of this newsletter will discuss how festival celebrations may contribute inreducing the quality of water in New Lake of Sector 42. Further, the various efforts taken by the Chandigarh Administration to improve the water quality of its lakes, are discussed in Section 6 of this newsletter.

5. Chatt Puja and water quality of New Lake

During Chatt Puja celebrations in Chandigarh, thousands of devotees assemble in New Lake of Sector 42, and pray God Sun. Several activities involved during the celebrations may lead to the contamination of the Lake's water. Therefore, CPCC also estimates the quality of New Lake's water pre, during and after the celebrations of Chatt Puja. The analysis of this data, for the last five years i.e., 2016 to 2020, is shown in Figure 4.

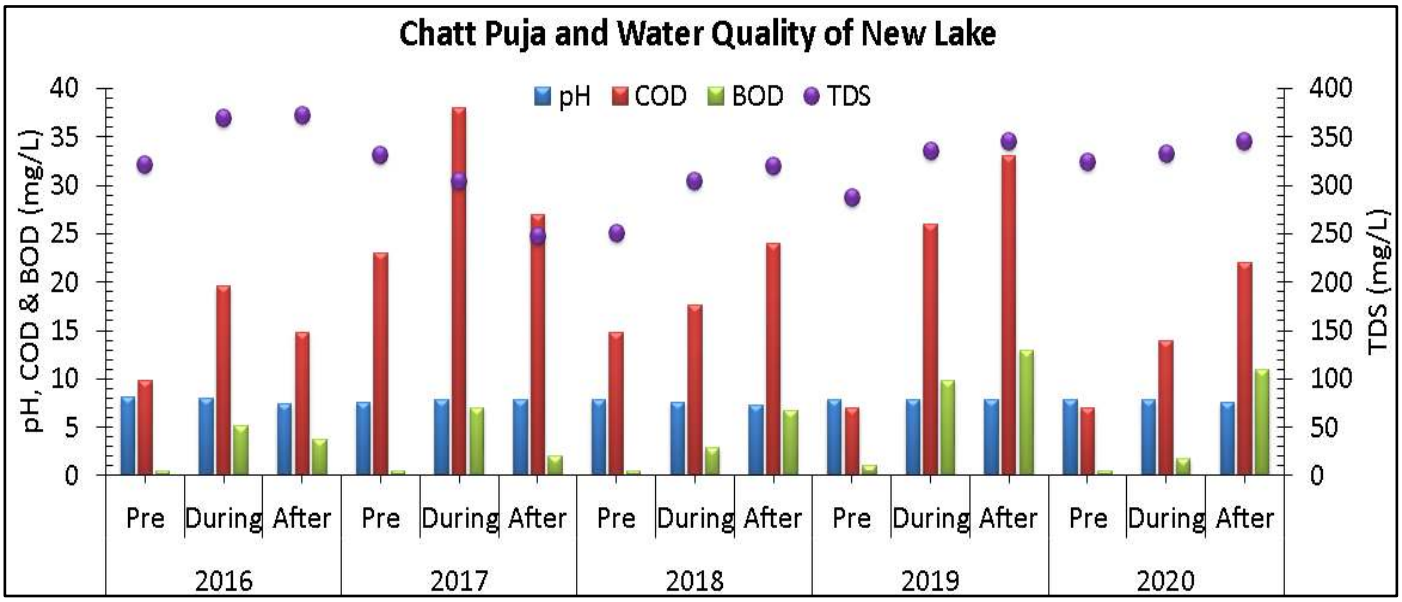

Figure 4. Water quality of New Lake :Pre ,during and after Chatt Pooja

Figure 4, illustrates the impact of Chatt Puja on the pH, COD, BOD and TDS of the New Lake's water. From Figure 4, it is clearly evident that after the Chatt Puja, the value of all the parameters of water increases and hence, contribution of several organic pollutants during the different ceremonies of Chatt Puja can be speculated.

6. Efforts made by Chandigarh administration to preserve Chandigarh's lakes

Plantation/Afforestation: With an objective of preventing the silt particles from entering the lakes and decreasing their depths, Chandigarh administration has undertaken extensive plantation of the hedges of species such as, Arundo-done, Ipomoea, Kana etc., on the exposed and steep slopes of the lakes and the banks of choes. Similarly, in lower hills, endemic plant species such as, Khair, Kikar, Jalebi, Neem, Jamun, Peepal etc., were planted. Further, seeds of Jungle Jalebi, Kikar, Khair, Neem etc., were also sown on the high reaches of nearby hills. The detail, of plantation/affoerstation done by the Chandigarh Administration, are mentioned in Table 3.

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Table 3. Details of the plantation raised by the Chandigarh Administration
(Source: DCF, Department of Forest and Wildlife, UT Chandigarh)

Year	No. of plants (Neem/Jungle Jalebi/ Khair/ Shisham/ Pipal/Mango etc.)	Shrub cuttings (Arundo donax/ Ipomea/Kaner)	Patch sowing (seeds in Lakhs) (Neem/Jungle Jalebi/Khair/Shisham/Jamun /Pipal/Mango/Guava)
2013-2014	30,000	1,00,000	1.5
2014-2015	30,900	1,00,000	3.0
2015-2016	20,000	1,00,000	3.0
2016-2017	23,000	1,00,000	3.0
2017-2018	56,000	2,25,000	3.0
2018-2019	77120	1,50,000	3.0
2019-2020	67500	1,50,000	3.0
2020-2021	74500	1,50,000	3.0

Removal of Lantana: Lantana is an obnoxious weed that grows very fast and large portion of Sukhna Wildlife Sanctuary is infested with it. The uncontrolled growth of Lantana may suppress the growth of other useful and indigenous plant species and negatively impact the biodiversity of Sukhna Wildlife Sanctuary. Therefore, Chandigarh Administration regularly monitors the growth of Lantana around Sukhna Lake and makes all efforts to make it Latana-free.

Silt Retention Dams: Deposition of silt, in Sukhna Lake, was a major issue among Chandigarh administration. Therefore, while preventing the soil erosion by afforestation, the Department of Forest and Wildlife, Chandigarh Administration has also constructed several silt retention dams on different choes of Chandigarh. Details of these silt retention dams and their locations are described in Table 4 and Table 5.

Table 4. Details of the type of dam-specific construction done in Chandigarh
Source : DCF, Department of Forest and Wildlife, UT, Chandigarh

S.No.	Description	Total No.
1	Construction of silt retention dams	175
2	Repair, raising & strengthening of dams	39
3	Raising of waterholes	51
4	De-siltation of dams	41
5	Construction of Check dams (height 3-5 m)	59

Table 5. Location of the silt retention dams
(Source: DCF, Department of Forest and Wildlife, UT Chandigarh)

S.No.	Description	No. of dams	No. of silted dams
1	Kansal choe	63	55
2	Nathewala choe	42	34
3	Nepli choe	28	24
4	Ghareri choe	42	37
	Total	175	150

Aeration of Dhanas lake using Solar Power Plant: As an innovative approach, Chandigarh Administration installed a 10kWp floating solar electricity plant in Dhanas lake. The electricity generated by this solar plant is used to run a fountain on the Dhanas lake, that helps in its aeration and preventing Eutrophication. The pictorial view of the floating solar-power plant is shown in Figure 4.

Figure 4. Floating solar power plant of Dhanas lake

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Eco-tourism/Natural trails/Lakes in Chandigarh

Eco-tourism is a terminology used to encourage the concept of responsible traveling among the tourists by raising awareness and respect about the ecological conservation. In this regard, the Chandigarh administration has also constructed various 'Nature Trails' at different places in Chandigarh. The details of these 'Nature Trails' are mentioned in Table 6. In these 'Nature Trails',while strolling through the woods, hill-slopes and water bodies, the visitors can gain knowledge about the rich flora and fauna heritage of the city. In this way, it is expected that the visitors will understand the importance of the ecological conservation.

Table 6. Details of the different Nature Trails of Chandigarh

Start – End point of the trail	Distance (km)
Nepli Inspection Hut – Kansal Log Hut	**8**
Nepli gate to Nepli Inspection hut via Ghareri	**5**
Nepli gate to Nathewala and back	**6**
Nepli gate to Nepli Inspection hut via Nathewala	**6**
Kansal Loghut to Nepli gate	**6.5**
Kansal Loghut to Sukhomajri	**5**
Kansal Loghut to Kansal Loghut towards Bhagwanpura	**5**
Kansal Loghut to Kansal Loghut (Towards Nepli)	**2.5**

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