DESCRIPTION OF
STUDY SITES
For the present hydrobiological study four fresh water lentic ecosystems located in and around Hubli-Dharwad twin cities were selected. Dharwad is the district head quarters. Dharwad district extends between 14° 78' N latitude to 15° 50' N. latitude and 74° 48' E. longitude to 76° 00' E. longitude (Fig.1). The South-Western side of the district is adjacent to malnad. Therefore Dharwad district receives a moderate average rainfall of 380 mm. Fig.29 shows the monthly rainfall recorded during the study period. Dharwad district has a large number of fresh water ponds and a few lakes. Hubli-Dharwad twin cities are at 15° 25' N. latitude and 75° 00' E. longitude. It is the second largest city in the Karnataka state. The climate of this place is pleasant throughout the year and consists of three distinct seasons. The summer season starts from February and continues till the end of May. It is characterized by high atmospheric temperature, bright sunshine having longer days. The monsoon season starts in June and is up to the end of September. It is characterized by humid atmosphere and strong breeze. The winter commences from October and ends in January. The winter is characterized by dry air, bright sunlight and chilled weather. Convectional rains are very common during winter. Though the rains are by South-West monsoon commencing from June, there are rains by North-East monsoon also during the beginning of the winter.
FIG. 1. Location of Dharwad
The four waterbodies selected for the present study are:

1. **Unkal lake**: (Photos 1 and 2)

   This is at a distance of 5 kms from Hubli towards the Western side adjacent to the National High way No 4 (Poona-Bangalore Road). The lake was constructed during 1912 as per the plan of Dr. M. Vishweswaraiah. The total water spread area is 971040 m². The maximum depth when filled is 9 mts. but silt of 3 mts. has accumulated. It receives water from two streams, one from Myadagoppa side and another from Bairikoppa and Navanagar, a fast developing extension area between Hubli-Dharwad. Therefore there is possibility of sewage reaching the lake from newly inhabited areas. Through surface runoff from the neighbouring agricultural fields also water reaches this lake. It is used as a source of drinking water, supplying about 1/10 th of city's requirement. Though the washing and bathing activities are prohibited, being within the city limits, they are not controlled so efficiently.

2. **The Bairikoppa pond**: (Photos 3 and 4)

   It is a small pond adjacent to the village Bairidevarkoppa by the side of the National Highway No 4. It is about 5 kms away from Hubli towards the Western side. It is an oval shaped man-made pond. It is in a depression. The pond has an area of 455 m² and has a maximum depth of 3 mts. On the bank, little away, there are few big Neem trees. But, the water is well-exposed to sunlight and there is not much wind action on the surface of the water. The pond is devoid of macrophytes.
3. The Gopankoppa pond: (Photos 5 and 6)

It is a small perennial pond in the outskirts of Hubli towards the northern side. It has an area of 536 m². To this old tank repairs were made during the years 1984 and 1987. The pond has a maximum depth of about 4 mts. This pond is the source of drinking water for cattle and washing activities are going on in large scale.

After the repairs the pond was taken over by the local Raita Sangha which has taken up fisheries activities. Katla, Rohu, Silver carps and Mrigal are the common fishes that are reared. Though there are no trees on the bank of the pond, the pond water is not subjected to wave action by the wind, because it is located in a low lying area. The macrophytes are absent except for a patch of Typha at the margin of the pond. The water is constantly disturbed by the cattle that visit the pond and by the washing activity. The water is constantly disturbed by the cattle-bathing and by the washing activity. The water used to be green most of the time with the floating mass of algae and had foul smell.

4. The Neersagar lake: (Photos 7 and 8)

This lake is towards South-Western side of Dharwad city. It is on Dharwad-Kalghatagi road at a distance of 18 kms. from Dharwad. The lake is more or less round. The storage capacity of
the lake is 29 M.m³. The maximum depth is 10 metres. There are no trees on the sides of the lake so that it is subjected to wind action on the surface of the lake water. It is fully exposed to sunlight. There is an outlet on the right side of the bund. When the lake is full, the excess water from the lake overflows. The water from here is pumped to the purification works at Kanav Honnapur. The treated water is supplied to some parts of Hubli Dharwad twin cities for drinking. The lake has the macrophytes like Vallisnaria and Nitella.

Towards the eastern side is the village G. Basavankoppa and towards the western side is another village Neersagar. As the lake water extends to vast area near the villages occasional bathing, cattle wallowing, and to some extent washing activities will be going on, though these are prohibited. The lake receives water from a stream, the Bedti Nalla which flows to a distance of about 10 kms. before reaching the lake. On either sides of this stream paddy, ground nut and cotton are grown.

Fishing activities are going on this lake under the supervision of Karnataka Government Fisheries Department. One year prior to the commencement of the present study, the entire lake was emptied when it was felt that the water was polluted (the growth of some worms was observed).
Photo 1 - The Unkal lake - Near outlet

Photo 2 - The Unkal lake - Showing Catchment Area
Photo 3 - The Bairikoppa pond - Showing washing activity

Photo 4 - The Bairikoppa pond - Showing cattle bathing
Photo 5 - The Gopankoppa pond - Showing human settlement and cattle bathing

Photo 6 - The Gopankoppa pond - Sign board regarding pisciculture
Photo 7 - The Neerasagar lake - Water lifting spot

Photo 8 - The Neerasagar lake - Sign board regarding prohibition of bathing, washing and fishing.