1) **General geography and climatology:**

The exact geographical location of Beed district is at 16.65°N 74.13°E. It has a mean elevation of 530 meters (1738 feet). Beed district is located on the Deccan plateau. In the district, the main rivers are Manjara, Bendusra and Sindfana. The Balaghat range is close by. The soil of the area is rough and rocky largely consisting of basalt. Thin deposits of fertile black soil are found in the northern part and in the south at the western bank of Bendusra. The district experiences semi-arid, warm and dry climate, summers are lengthy, extending from the middle of February to June. Average temperature in summer vary between 31°C to 40°C. Winters are short with temperature between 12°C to 20°C. Rains are inadequate and take place only during the monsoon from mid June to September. The average annual rainfall is 666mm.

2) **Study area:**

The present investigation for detailed study of algal biodiversity was carried out on Manjara river and its reservoirs in Beed district of Maharashtra. Manjara river is one of the important river of Beed district. It originates in Gawalwadi and Kuslam hills, flows 141 kms in Beed district
and later enters in Latur district. In order to study the algal biodiversity of Manjara river in Beed district area, 10 sites were selected for the collection of algae on the down stream of river. These sites were of running water habitat, standing water habitat and one polluted site with running water habitat specifically. These sites are:

1) S$_1$ – Wanjara area – Running water
2) S$_2$ – Mahasangwi reservoir – Standing water
3) S$_3$ – Potada area – Running water (Polluted)
4) S$_4$ – Dokewadi reservoir – Running water
5) S$_5$ – Jankapur area – Running water
6) S$_6$ – Hingani reservoir – Standing water
7) S$_7$ – Jabapimpri area – Running water
8) S$_8$ – Nandurghat reservoir – Standing water
9) S$_9$ – Boregaon area – Running water
10) S$_{10}$ – Manjara reservoir – Standing water

1) S$_1$ (Wanjara area): This site is located near the Beed-Ahmednagar road. Cattle wadding, sometime swimming activity of human being is observed.

2) S$_2$ (Mahasangwi reservoir): It is situated near the Mahasangwi village. This site is 18 kms away from S$_1$. At this site the human interaction was observed by fishing, washing of clothes by villagers and irrigation. Algal blooms were observed at this site in post monsoon and early summer.
3) S₃ (Patoda area): This site is located near the Patoda town. It is 8 kms away from the S₂. The site becomes polluted due to continuous release of domestic sewage through drainage system. Blooms of *Microcystis* were observed in months of Summer season.

4) S₄ (Dokewadi reservoir): This reservoir is located near Dokewadi village. The site is 20 kms away from S₃. Human disturbance at this site is in the form of fishing, swimming and washing of clothes.

5) S₅ (Jankapur area): This site is located near Jankapur village. It is 10 kms away from S₄. At this site very less human disturbance is observed.

6) S₆ (Hingani reservoir): This is small reservoir situated near Hingani village. It is 12 kms away from S₅. Human activities such as swimming, washing of clothes has been observed at this site.

7) S₇ (Jabapimpri area): This site is located near Jabapimpri village. It is 15 kms away from S₆. Cattle wadding and very less human disturbance is observed at this site.

8) S₈ (Nandurghat reservoir): It is small reservoir located near Nandurghat village and 18 kms away from S₇. Very less human disturbance was observed at this site. Algal blooms were observed in post monsoon and early summer period.

9) S₉ (Boregaon area): The site is located near Boregoan village and it is 20 kms away from S₈. Cattle wadding, washing of domestic animals and washing of clothes by local villagers is observed at this site.
10) **S$_{10}$ (Manjara reservoir):** This is large reservoir located near Dhanegaon and it is 20 kms away from S$_9$. Water of this reservoir is used by people for drinking and irrigation purpose. Fishing activity is also observed at this site.

3) **Field Work:**

Algal samples were collected at monthly intervals from ten selected sites during June 2007 to May 2009. Acid washed collection bottles were used for the collection of algal samples. Floating, Planktonic, submerged and attached epiphytic algal samples were collected separately in collection bottles. Plankton net was used to collect Planktonic algae. After collection, algal samples were brought immediately to the Laboratory. The algal samples were preserved in 4% formalin for further taxonomic investigations.

4) **Laboratory work:**

a) **Biodiversity study:**

The biodiversity studied for qualitative analysis of algae. The fresh as well as preserved algal forms were observed under microscope and identified. Micrometry is an important and essential element in the taxonomical studies. The measurements with the ocular and stage micrometer were recorded. They were then used for identification of different taxa. Line drawings of different forms of algal taxa were made by prism type of Camera lucida at the stage level. Microphotographs were also taken and presented in taxonomic description of algae. Identification of

Taxonomic account of all identified algal taxa were made for the five groups of algae viz.

i) Chlorophyceae

ii) Charophyceae

iii) Euglenophyceae

iv) Bacillariophyceae

v) Cyanophyceae

b) Pollution index:

Palmer (1969) proposed pollution index based on pollution tolerant genera and species to determine water quality. He proposed two indices as

1) Palmer’s Algal Genus Index

2) Palmer’s Algal Species Index

The pollution tolerant genra and species of algae were recorded for each site of manjara river and its reservoirs. A list was made of significantly occurring algal genera and species in the samples for all the sites. Twenty most frequent occurring genera and species were taken into account. The pollution index factor was assigned to each genus. The index factors of the algae present were then totaled. For rating pollution of water samples, observations according to Palmer (1969) were made. The following
numerical values have been followed for determining the level of organic pollution:

i) 0 – 10 – Suggest lack of organic pollution

ii) 10 – 15 – Indicate moderate pollution

iii) 15 – 20 – Indicate probable high organic pollution

iv) 20 or more – Confirmed high organic pollution

v) 44 – Theoretical maximum (probably not attainable except under the most stringent artificial conditions)

The lower figures below 15 indicate that

- Organic pollution is not high
- Sample is not representative or
- Some substance of factor interfering with algal persistence is present and active.

This pollution index was calculated for all the sites during the two years study period.