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3. MATERIALS AND METHODS

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3.1 MATERIALS.

3.1.1 STUDY AREAS

Hydrobiological studies were carried out at Terna Project, Ter, Ta. and Dist. Osmanabad, Maharashtra.

3.1.1.1 METROMORPH OF Terna PROJECT

Location

The Terna Project is located on Terna river, near to the historical village Ter, Ta. & Dist. Osmanabad of Maharashtra State. This Project is situated about 22km from Osmanabad city.

Geographically it is located on 18° – 19’ – 59” N latitude and 76° – 6’ – 14” E longitudes.

Three sampling stations (sites) were established, using representative sites based on the morphometric features of the reservoir with regard to topography.

3.1.1.2 Climate.
The Terna Project, Ter lies near to the Osmanabad city. This is situated at about 600 meters of MSL.

Osmanabad is one of the district of Marathwada region of Maharashtra and famous for Tuljabhavani temple of Tuljapur. It is situated in the southern part of state abutting Andhra Pradesh in south and lies between north latitudes 17°37’ and 18°42’ and east longitude 75°16’and 76°47’. It has Eight talukas ie Osmanabad, tuljapur, Omerga, Lohara in Osmanabad subdivision and Kallam, Bhoom, Paranda, Washi in Bhoom subdivision. It has total population of 14, 86,586 as per 2001 census.

The climate of the district is characterized by a hot summer and generally dryness throughout the year except during the south-west monsoon season ie June to September.

The annual rainfall is an average 600 to 850 mm. The rainy season starts from mid of June and remains till end of September. From October to November the climate is humid. From mid November to January it is winter. From February to March climate is dry, April to June is summer. The temperature of the study site is an average about 10°c to 43°c.

The temperature to osmanabad district is low as compare to other district of Marathwada region of Maharashtra.

Most part of district is surrounded by small mountains called Balaghat. The district forms part of Deccan plateau, with slope towards southwest and south and has a varied topography consisting of hills, plains and undulating topography near riverbank.
3.1.1.3 CONSTRUCTION OF ‘TERNA PROJECT’, TER.

The construction of Terna Project takes place on the river Terna which is originated from village ‘Terkheda’ Ta. Washi, Dist. Osmanabad, Maharashtra. The construction of ‘Terna Project’ is completed in year 1956. The total expenditure for this Project is about 259.09.

The river ‘Terna’ is an important tributary of the river Manjara, in its branch through Ausa Taluka in Latur district of Maharashtra. River Manjara is a tributary of Godhavari River which originates from Balaghat hills near Ahmednagar taluka of Latur district. It flows through latur district and Bidar district (Karnataka) before entering Medak district of Anadhraprdesh.

The length of ‘Terna’ river is 150 km. it flows from Osmanabad, Latur and Solapur district. Subrivers of Terna are Saroli, Rui, Kajala, and Wadala. Number of Projects are constructed on Terna river such as Terna Project, Ter, Ta.& Dist. Osmanabad; Makani (Ta. Lohara); Kajala Project; Wadala Project; Saroli Project. Beside Terna, Manjara, Sina, Bori, Benitura, and Banganga are the main rivers flowing through the Osmanabad district.

There are total 2513 ponds in this district, while according to the ministry of water resources, central ground water board (2009) the allocation for domestic and industrial water requirements for next 25 years is 33.89Mcm for this district.
MORPHOMETRIC FEATURES OF ‘TERNA PROJECT’.

1. Height of Dam -15.39 m
2. Total length of Dam -1531.10m
3. R. F. canal length -17.6 kms.
4. L. F. canal length -14.4 kms.
5. Maximum capacity (10 lakh cubic meter ) -20.55
6. Maximum water storage capacity -45 cu.mm
7. Total benefit area - 2,412 hector.
8. Total cultivable area -1928 hector.
9. Total submerged area - 430 hector.

3.1.1.4 Utilization

The Terna Project, Ter Ta. & Dist. Osmanabad is constructed to serve definite purpose. The main purpose is to provide drinking water to osmanabad and Dhoki city, as well as nearby villages like Ter and other small villages. The water is also utilized for irrigation purpose by the right and left canals of about 14 to 16 kms from dam.

Total 15 villages get the benefit of water from this dam. The Project also provides natural habitat for plants, birds, grazing animals and also attracts the visitors during rainy season to see the attractive water falls from KT weir (outlet). The fish culture is also carried out in this Project.
3.1.2 Sampling sites

Three sampling sites of the reservoir were selected for the study. The outlets, inlets, morphometric features are the important factors considered during the selection of the sampling sites.

3.1.2.1 Site No. I (Inlet Area): West side of the Project.

This sampling site was fixed at a west side of the bridge, the village Khamgaon is located to this side.

3.1.2.2 Site No. II (Storage Area): Near the Jack well, osmanabad water supply scheme.

This sampling site is located at the North side of the Project, towards the Dhoki road. A Jack well is constructed to this side. This side is surrounded by moderate depth of the water.

3.1.2.3 Site No. III (Outlet Area): Near KT weir, towards South side.

This site is located nearer to the canal system by which the water is supplies to near by villages for agri. purpose. This site is located towards the village Thodasarwadi. The aquatic vegetation is very rich at this site; muddy type of bank is the characteristics of this site.

3.2 METHODS

The selected sampling sites were visited monthly for the study of the various ecological parameters. The study was complete in two years from June 2009 to May 2011.
Surface water sample of four sites were collected during the day time to analyze the physical chemical and biological parameters. The water samples were collected in the plastic cans. Before collecting, the can was rinsed thoroughly by sampling water and the can was sealed after collecting the sample.

### 3.2.1 Ecological Parameters.

The ecological parameters like physical, chemical and biological parameters were studied during the two years periods. Some of the parameters were studied on the spot at sampling sites, whereas some parameters were studied in the laboratory by carried the water samples from the study area.

### 3.2.2 Physical Parameters.

The physical parameters such as temperature, transparency and pH were performed at the fixed three sites. The air temperature and water temperature were recorded at the fixed sites of the dam by using a mercury thermometer. The transparency of light was measured by using secchi disc. The pH of water was determined by pH meter (Hanna Model Champ).

### 3.2.3 Chemical parameters

The chemical parameters of water such as dissolved oxygen, free carbon dioxide, total alkalinity, total hardness, total dissolved solids, calcium, magnesium, chlorides, nitrates, phosphate, Biological oxygen demand (BOD)
were determined by standard methods described by American Public Health Association (APHA 1980), Trivedy et al. (1998) and Kodarkar et al. (1998).

3.2.4 Biological Parameters

The study of zooplankton is carried out by the monthly collection of water sample of three sampling sites for the period of two years.

Water sampling done once in each month between 7:00 am to 11:00 am. The water samples for zooplankton were collected by filtering 100 liters of surface water through net of bolting silk No. 25. The collected plankton samples were preserved in 4% formaline in 100 ml bottles. A label is affixed to the bottles indicating the site number, date of sampling, water temperature, transparency, pH etc.

The preserved samples were studied for the diversity of zooplanktons under the research binocular microscope by using standard keys and literature (Tonapi 1980, Muruga 1988, Kodarkar et al., 1998 and Kodarkar et al. 2006).
### Table No. 1- Methodology for the Analysis of Parameters.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Parameter</th>
<th>Method</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Atmospheric temperature</td>
<td>Thermometer</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>Water temperature</td>
<td>Thermometer</td>
<td>Biocraft water analysis kit.</td>
</tr>
<tr>
<td>3</td>
<td>Rain fall</td>
<td>--</td>
<td>Data from irrigation Dept. of Govt. Of Maharashtra.</td>
</tr>
<tr>
<td>4</td>
<td>Total water volume</td>
<td>--</td>
<td>Data from irrigation Dept. of Govt. Of Maharashtra.</td>
</tr>
<tr>
<td>5</td>
<td>pH</td>
<td>Hanna’s pH meter</td>
<td>---</td>
</tr>
<tr>
<td>6</td>
<td>Transparency</td>
<td>Secchi Disc</td>
<td>Biocraft water analysis kit.</td>
</tr>
<tr>
<td>11</td>
<td>Total dissolved solids</td>
<td>Dried residue</td>
<td>APHA 1980, Kodarkar 1998 &amp;</td>
</tr>
<tr>
<td></td>
<td>Parameter</td>
<td>Method</td>
<td>Reference</td>
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<tr>
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<td>------------------------------------------------</td>
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<tr>
<td>17</td>
<td>Chlorides</td>
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</tr>
<tr>
<td>18</td>
<td>Zooplankton</td>
<td>Sample collection</td>
<td>Plankton collection net (bolting sr. no.25)&amp; Sedgwick-Rafter cell method.</td>
</tr>
</tbody>
</table>
MAP OF INDIA
MAP OF MAHARASHTRA SHOWING OSMANABAD DISTRICT

MAP OF OSMANABAD DISTRICT SHOWING TERNA RIVER AND PROJECT
SATellite photo of Terna Dam (Project)
Site no. 1 collection of water

Site no. 1 Checking of temperature
Site no. II collection of water

Site no. II recording of Transparency
Site no. III collection of water

Site no. III checking of pH

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