

# ASSESSMENT OF WATER QUALITY AT THE POLLUTED AREA OF TERNA RIVER IN OSMANABAD DISTRICT MAHARASHTRA STATE INDIA

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**ABSTRACT :** Water pollution is a large set of adverse effects upon water bodies such as lakes, rivers, oceans, and groundwater caused by human activities. Although natural phenomena such as volcanoes, storms, earthquakes, etc. also cause major changes in water quality and the ecological status of water, these are not deemed to be pollution. The present study deal with the Assessment of Water Quality at the Polluted Area of Terna River in Osmanabad District Maharashtra State India. Terna river water samples were collected from five different spots in five different months in Osmanabad district (M. S.) After collection of samples six different parameters like Physical appearance, Temperature, PH, Turbidity, Total Hardness & Total solid were studied. Results showed that seasonal variation in water parameters at different areas. The chemical analysis of water was carried out in the light of APHA (1985) & compared with the WHO, ICMR & ISI standard.

**Keywords:** Physicochemical character, seasonal variation, water quality, Terna River Five spots.

## INTRODUCTION:

Pollution can be defined as an undesirable change in the physical, chemical, or biological characteristics of the air, water or land that can harmfully affect health, survival, or activities of human or other living organisms. Pollution may interfere with all forms of living systems. Pollutants are substance, especially wastes that have deleterious effects on living organisms. The indiscriminate disposal of water after use in the form of waste water causes water pollution. Most of the rivers in India are polluted due to industrial activity Thus in Bombay; Ulhās river is polluted due to disposal of effluents from rayon and dyestuff industries. Water pollution is a large set of adverse effects upon water bodies such as lakes, rivers, oceans, and groundwater caused by human activities. Although natural phenomena such as volcanoes, storms, earthquakes, etc. also cause major changes in water quality and the ecological status of water, these are not deemed to be pollution. Water pollution has many causes and characteristics. Increases in nutrient loading may lead to eutrophication. Organic wastes such as sewage impose high oxygen demands on the receiving water leading to oxygen depletion with potentially severe impacts on the whole eco-system. Industries discharge a variety of pollutants in their wastewater including heavy metals, organic toxins, oils, nutrients, and solids. Discharges can also have thermal effects, especially those from power stations, and these too reduce the available oxygen. Silt-bearing runoff from many activities including construction sites, deforestation and agriculture can inhibit the penetration of sunlight through the water column, restricting photosynthesis and causing blanketing of the lake or river bed, in turn damaging ecological systems. Pollutants in water include a wide spectrum of chemicals, pathogens, and physical chemistry or sensory changes. Many of the chemical substances are toxic. Pathogens can obviously produce waterborne diseases in either human or animal hosts. Alteration of water's physical chemistry includes acidity, conductivity, temperature, and eutrophication. Eutrophication is the fertilization of surface water by nutrients that were previously scarce. Even many of the municipal water supplies

in developed countries can present health risks.

Water pollution is a major problem in the global context. It has been suggested that it is the leading worldwide cause of deaths and diseases Sinkule et al; (1995), and that it accounts for the deaths of more than 14,000 people daily

## MATERIALS AND METHODS :

The water samples of Terna River were collected from five different spots i.e. from Wanewadi, Ternanagar, Takdi, Boregaon & Bebli of Osmanabad district in polythene bottle of capacity 1 to 2 liter in the month of December 2009 to April 2010. The water samples were analyzed to access the physico chemical parameters. The standard procedure was adopted for the determination of physico-chemical parameter given by APHA (1989) & Trivedy & Goel (1986). Each sample was analyzed for important physico-chemical parameter such as Physical appearance, Temperature, PH, Turbidity, Total Solid, Total Hardness etc.

## RESULTS AND DISCUSSION :

Physicochemical analysis of river water from different five spots of Terna river from month December 2009 to April 2010 is shown in table no. 1 to 5 which shows that

- 1) **Physical Appearance:** - Water sample from all the spots in every month is turbid due to entering of domestic industrial and agriculture waste.
- 2) **Temperature:** - Temperature of water depends on the season and on the temperature of the ground with which it is in contact R.K. Trivedy et al; (1984). Temperature important for its on the chemical and biochemical reactions in the organism. R.N. Trivedy et al; A rise in temperature of the water leads to the speed up of the chemical reactions in water, reduces the solubility of gases, the tastes and odour. D.Kelin et al; (1959) and U.N. Mahida et al; (1981). The maximum temperature was recorded at spot no. 5 and minimum temperature was recoded at spot No. 1 in every month.
- 3) **PH:**-PH serves as an index to denote the extent of pollution in case of pollution by acidic and alkaline wastes. P.K. saxena



et al; (1988). All Chemical and biological reactions are directly dependent upon the PH of water system. A Sreenivason et al; (1967). In present investigation PH indicated almost neutral range (6.8-7.21). Maximum PH value of 7.2 was recorded at spot No. 5 December 2009. Maximum PH value of 7.3 was recorded at spot no. 5 in Jan 2010. Maximum PH value of 7.2 was recorded at spot no. 5 in Feb 2010.

Maximum PH value of 7.3 was recorded at spot No. 5 in March 2010. While, Maximum PH value of 7.5 was recorded at spot No. 5 in April 2010.

The PH limit fixed by Indian standards (ISI) for bathing and drinking in between (6.5-8.5) L.S. Elango et al; (1992)

Hence PH of these water samples is within the standards

**4) Turbidity:** - Turbidity is an indicator of impurities dissolved solid in the water body. In the present investigation samples from all spots in every month are exceeding the desirable limits that are the sewage domestic water and individual water include increase dissolved solid investigation the turbidity of the solution.

**5) Total solid:** - The total solid content is also a indicator of pollution status sewage, domestic and industrial waste water and dumping of animal and human excreta in water body always increases the total solid. This may be reason for increased total solid at all spots.

In the present investigation in Dec. 2009 the spot No. 5 is showing the above desirable limit while spot No. 1,2,3 and 4 are within the limit In Jan., Feb., March 2010 the spot no.4 and 5 is showing the above desirable limit while spot No. 1,2 and 3 are within the limit while.

In April 2010 the spot No. 3,4 and 5 is showing the above desirable limit while spot No. 1 and 2 are within the limit.

Thus the high quantity of total solids may be attributed to domestic and industrial waste water suspensions entering the river.

**6) Total Hardness:** - Hardness of water is due to carbonate bicarbonates sulphate calcium silicates magnesium etc. V.S. Lomte et al; (1998). Hardness of samples at spot no. 4 and 5 is showing the above desirable limit while spot No. 1, 2 and 3 are within the limit.

**Table 1 Physico- Chemical Analysis Of Terna River (December 2009)**

Parameter	Wanewadi	Ternanagar	Takdi	Boregaon	Bembli
Physical Appearance	Turbid	Turbid	Turbid	Turbid	Turbid
Temperature C <sup>0</sup>	21	22	23	23	24
PH	6.8	7.00	7.00	7.1	7.2
Turbidity (NTU)	12	13	13	14	15
Total Solids (mg/lit.)	310.0	330.0	370.0	430.0	505.0
Total Hardness (mg/lit.)	75.0	88.0	96.0	204.0	230.0

**Table 2 Physico- Chemical Analysis Of Terna River (January 2010)**

Parameter	Wanewadi	Ternanagar	Takdi	Boregaon	Bembli
Physical Appearance	Turbid	Turbid	Turbid	Turbid	Turbid
Temperature C <sup>0</sup>	22	22	23	24	25
PH	7.00	7.1	7.1	7.2	7.3
Turbidity (NTU)	10.0	11.0	11.0	12.0	13.0
Total Solids (mg/lit.)	280.0	370.0	420.0	500.0	580.0
Total Hardness (mg/lit.)	76.0	90.0	97.0	230.0	250.0

**Table 3 Physico- Chemical Analysis Of Terna River (february 2010)**

Parameter	Wanewadi	Ternanagar	Takdi	Boregaon	Bembli
Physical Appearance	Turbid	Turbid	Turbid	Turbid	Turbid
Temperature C <sup>0</sup>	23	24	24	25	26
PH	7.00	7.00	7.00	7.1	7.2
Turbidity (NTU)	13.0	13.0	14.0	14.0	16.0
Total Solids (mg/lit.)	330.0	370.0	450.0	550.0	670.0
Total Hardness (mg/lit.)	75.0	87.0	98.0	220.0	300.0



**Table 4 Physico- Chemical Analysis Of Terna River (March 2010)**

Parameter	Wanewadi	Ternanagar	Takdi	Boregaon	Bembli
Physical Appearance	Turbid	Turbid	Turbid	Turbid	Turbid
Temperature C <sup>0</sup>	24	25	26	26	27
PH	6.9	7.1	7.1	7.2	7.3
Turbidity (NTU)	14.0	15.0	15.0	16.0	17.0
Total Solids (mg/lit.)	340.0	380.0	450.0	600.0	700.0
Total Hardness (mg/lit.)	69.0	81.0	96.0	260.0	310.0

**Table 5 Physico- Chemical Analysis Of Terna River (April 2010)**

Parameter	Wanewadi	Ternanagar	Takdi	Boregaon	Bembli
Physical Appearance	Turbid	Turbid	Turbid	Turbid	Turbid
Temperature C <sup>0</sup>	26	27	28	30	31
PH	6.9	7.0	7.2	7.3	7.5
Turbidity (NTU)	14.0	15.0	15.0	17.0	18.0
Total Solids (mg/lit.)	350.0	400.0	500.0	690.0	750.0
Total Hardness (mg/lit.)	70.0	78.0	89.0	215.0	350.0

#### CONCLUSION :

Analysis of five different samples from five different spot for five consecutive months indicates that degree of pollution increases as the river reaches heart of the village. Similarly the rise in degree of pollution is also observed as we go from autumn to summer. Samples in the autumn season are showing lower degree of pollution while these in summer are showing higher degree of pollution

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