



**GOVERNMENT OF MAHARASHTRA
WATER RESOURCE DEPARTMENT**

**HYDROLOGY PROJECT (SW)
Chief Engineer Hydrology Project, Nashik**



Water quality Lab Level-II, Kolhapur

**ANNUAL REPORT
2011-2012**

**Superintending Engineer
Data Collection, Planning & Hydrology Circle, Nashik**

PREFACE

Well equipped (level-II) grade water quality laboratory at Kolhapur, is set up under technical assistance of World-Bank aided Hydrology Project, for monitoring the surface water quality of Krishna basin and west flowing rivers of Konkan region (in Ratanagiri & Sindhudurg district) in Maharashtra state.

The present annual report is prepared for the water - year 01/06/2011 to 31/05/2012 with the consideration of monsoon season from June to September and non-monsoon from October to May.

This report includes water quality data in Krishna Basin and Part of Konkan (west flowing rivers) for the period of June 2011 to May 2012. The data has been interpreted to known the affected locations.

This report attempts to briefly describe an over view and general conclusion based on the basis of water quality data of water samples collected from selected locations for define frequencies for the reported period.

Govt. Analyst

WQ Lab level - II

HP Sub-Division Kolhapur

Assistant Engineer Gr.I

HP Sub- Division

Kolhapur

ExecutiveEngineer

Hydrology Project Division

Pune - 1

Annual Report
On Water Quality Monitoring through Water Quality Lab Level-II, Kolhapur
for the Year 2011 - 12

I N D E X

Chapter	Particulars	Page No.
I	Executive Summary	6-8
II	Introduction	10-17
III	Methodology	19-25
IV	Result & Observation	27-53
V	Conclusion	55
VI	Other Activities	57
VII	Annexure	58-65

Annual Report

On Water Quality Monitoring through Water Quality Lab Level-II, Kolhapur for the Year 2011 - 12

ANNEXURE

Chapter	Particulars	Page No.
I	List of Clients 2011 - 12	59-60
II	Quality Policy towards ISO 9001: 2008	62
III	Map	63-65

CHAPTER - I

Executive Summery

Chapter - 1
Executive Summery
Annual Report
On Water Quality Monitoring through Water Quality Lab Level-II, Kolhapur
for the Year 2011- 12

1.1 Preamble:

Water is the most vital resources for life. With the increasing population & changing life patterns, consumption of water has increased many folds particularly for domestic, agriculture, & industrial consumption. “The negative change in physical, chemical & biological properties of natural water due to addition of pollutants causing adverse effect on aquatic life, & other living being, including man is known as water pollution.”

The water quality monitoring in the area of surface water is performed in order to determine the quality of water. There are 26 stations comes under Kolhapur Level – II, from Kolhapur, Sangli, Satara, Ratnagiri & Sindhudurga district. For each station 29 parameters are analyzed in the laboratory and 6 parameters are tested at field level. All these records store monthly in SWDES and used for preparing the annual report. These data are considered in order to specify the quality of water at each location. This also helps to identify concentration of water pollution in each source of water at each station.

1.2 Water Quality Monitoring – Objectives

The main objectives of surface water quality monitoring in Maharashtra state is to collect the comprehensive data on the status of present health of important water resources i.e. rivers & reservoirs so as:

- 1) To establish Base Line water quality.
- 2) To detect the trends in water quality changes.
- 3) To provide warning of potentially deleterious changes.
- 4) Surveillance of available resources for drinking and/or irrigation use.

Observations of analysis of physical & chemical parameters as per “Uniform Protocol for Water Quality Monitoring Order 2005” for each location followed by Operation and Maintenance of Water Quality Laboratory Level-II, Kolhapur as per Standard Guidelines and mandates including collection, transportation and analysis of samples , data entry in SWDES Software. Preparation of the Annual Report as per specific guidelines issued by Superintending Engineer, Hydrology Project Circle (Collection), Nashik,

1.3 Water Quality Monitoring

The Annual Report is prepared for the year 2011 – 12 in combined. The Table below shows the number of sample analyzed during the reported period. In order to study water quality status station wise, all locations covered under this lab during the year 2011- 12 are considered.

TABLE SHOWING SAMPLES ANALYSED DURING THE REPORTING PERIOD

Sr. No.	Year	Baseline Sample	Flux Sample	Trend Sample	Dam Sample	Total
1	2011 - 12	08	12	155	12	187

Seasonal averages of all analyzed parameters are calculated for study of seasonal water quality trend at each location.

1.4 Methodology:

Analysis of Physical and Chemical parameters is done in the laboratory on the basis of Standard Analytical Methods, Instrument Operating Instructions, Water Quality Manuals, CPCB Guidelines and APHA, 21st Ed., 2005.

Every month after analysis of sample data is collected, validated & entry is carried out in rough data sheet. This finally validated data is entered in SWDES software & then send it to the Data Storage Center, Nashik by mail for storage as per instructions of water quality manual.

1.5 Result and Observation:

After observing all this data it is clear that most of the physical parameters are within tolerance limit.

Most of the chemical parameters are also within tolerance limits.

Bacteriological parameters like Total Coliform and Faecal Coliforms are also exceeding the limits.

1.6 Conclusion

Biological parameter in all locations contain higher bacterial count is due to the discharge of sewage, drainage waste in to the water sources. Even human activities also increase number of various types of bacteria in the water, which increase the number of count in the water.

1.7 Recommendations/Remedial Measures:

- Domestic effluents should be treated and disinfected before discharging.
- Effluents from the non-point sources should be identified. These are required to be collected and treated.
- Use of water of such polluted locations may be useful for salt tolerance crop and is recommended based on special study.
- Use of direct source of water should be avoided.
- Bathing at such location should be restricted.

1.8 Suggestions:

- Create mass awareness in general public regarding surface and ground water quality aspects.
- Water quality Annual Report shall be publicly published every year.

CHAPTER - II

Introduction

Chapter - 2

Introduction

2.1 General

To check the pollution load & water safety for different uses there is need to regularly monitor water quality by using laboratory analysis method. The test includes physico-chemical parameters & biological parameters.

The water quality monitoring in the area of surface water is performed in order to determine the quality of water. There are 26 stations come under Kolhapur lab Level – II, from Kolhapur, Sangli, Satara, Ratnagiri & Sindhudurga district. For each station 29 parameters are analyzed in the laboratory and 6 parameters are tested at field level. All these records store monthly in SWDES and used for preparing the annual report. These data are considered in order to specify the quality of water at each location. This also helps to identify concentration of water pollution in each source of water at each station.

2.2 Water Quality Monitoring - Objectives

The main objectives of surface water quality monitoring in Maharashtra state is to collect the comprehensive data on the status of present health of important water resources i.e. rivers & reservoirs so as:

- 1) To establish Base Line water quality.
- 2) To detect the trends in water quality changes.
- 3) To provide warning of potentially deleterious changes.
- 4) Surveillance of available resources for drinking and/or irrigation use.

Observations of analysis of physical & chemical parameters as per “Uniform Protocol for Water Quality Monitoring Order 2005” for each location followed by Operation and Maintenance of Water Quality Laboratory Level-II, Kolhapur as per Standard Guidelines and mandates including collection, transportation and analysis of samples , data entry in SWDES Software and preparation of the said Annual Report as per specific guidelines issued by Superintending Engineer, Hydrology Project Circle(Collection), Nashik.

2.3 Water Quality Monitoring – Scope

- Seasonal averages of all analyzed parameters are calculated for study of seasonal water quality trend at each location.
- Used analysed data for preparation of annual report or study purpose.
- Find out major pollutants in river water at each station.
- Identify remedial measures for water quality.

2.4 Other activities

Other than working of regular Water Quality Monitoring for Water Quality lab level II at Kolhapur, we also analyzed water sample of Government, Semi Government, and Private sector.

Apart from HP sample drinking water, industrial effluent bore water, lake water, and irrigation water analysis is carried out in lab. Most of the students are also approach for analysis of water for study purpose.

During the year 2011 - 12 many clients approached to the laboratory. Are as follows -

- 1) Kolhapur Irrigation Division
- 2) Abhishek Industry, MIDC Kolhapur.
- 3) Aadhar nursing home, Kolhapur.
- 4) Shivaji University Students, Kolhapur.
- 5) Dudhaganga Canal Division.
- 6) Podar Education Trust, Kolhapur.
- 7) Ichalkaranji Nagarparishad, STP Sample.
- 8) Griesel- Green Commitment, Kolhapur.

The revenue collected during the reported period is as follows.

Sr. No	Year	Amount
1.	2011 - 2012	72,577/-

2.5 Extra activity

Water Quality Lab Level – II @ Kolhapur is achieved 87 % marks in CPCB AQC 2012.

**SALIENT FEATURES OF WATER QUALITY LABORATORY,
AT RAJARAM TANK, KOLHAPUR.**

Address	:	Hydrology Project Sub-Division, Kolhapur Water Quality Lab Level- II. At Rajaram Tank, Opp. Shivaji University, Sarnobat wadi Road Kolhapur – 416 004.
Latitude	:	16 ⁰ 42' 41''
Longitude	:	74 ⁰ 17' 00''
Year of Establishment	:	1 st - February-2003.
No. of Baseline Sample locations	:	4 Nos.
No. of Flux locations	:	2 Nos.
No. of Trend Sample locations	:	19 Nos.
No. of Reservoir locations	:	1 No.
No. of Parameters Analysed	:	34 Nos.
Staff Position	:	Work of Operation & Maintenance of Lab. on annual contract basis.
Government officer/ staff related to the laboratory	:	1. Er. A. A. Dabhade. Executive Engineer 2. Er. S. D. Raje. Assistant Executive Engineer Er. R.R. Deshpande. Govt. Analyst Assistant Engineer- II

Agency Staff related to the laboratory	:	<p>M/S Mahabal Enviro Engineers Pvt. Ltd. Pune.</p> <ol style="list-style-type: none"> 1. Mr. R. B. Mahabal. Managing Director. 2. Miss. S. S. Sadarekar. Chief Chemist. 3. Miss. S. V. Mudgal Senior Research. Assistant. 4. Miss. M. C. Kalekar Chemist. 5. Mr. P. R. Mali. Field Chemist.
Other Activities		<p>1.Participation in AQC (Intra Lab exercise & CPCB AQC In SW Maharashtra)</p>

Scope of Work: Operation and Maintenance of water Quality Laboratory Level - II, Kolhapur

Outdoor Work:

Collection of surface water and transporting the sample from selected Water Quality network sampling points

as per schedule of sampling during the said period.

The Surface Water sampling includes:

- a) Field determination as per standard guideline.
- b) Field parameters to be tested on site & entry to be taken on ID form.
- c) Sample to be transported to laboratory within prescribed time limit.

Indoor Work:

- Day to Day Operation and Maintenance of Water Quality Laboratory Level II.
- The work includes analysis of water samples as per the test procedures.
- Operating the instruments as per specified instruction manual.
- Entry of data in SWDES Software.
- Participating in Analytical Quality Control Exercise (AQC) round.
 - i) Within Laboratory AQC
 - ii) Intra Laboratory AQC

The Laboratory staff employed;

- 1) Chief Chemist: 1 No.
 - 2) Sr. Research Officers: 1 No.
 - 3) Research Assistant: 2 Nos.
 - 4) Lab. Assistant: 1 No.
- The Indoor work also includes keeping data record.
 - Log book of Lab equipment
 - Preparation of monthly sampling Schedule.
 - Keeping sampling record, instruments operation, Laboratory Management, demonstration
 - Training to Departmental staff as and when required.

Information to visitors & Customer Satisfaction. Work is carried out as per flow chart.

Hydrology Project Circle (Collection), Nashik

Water Quality Lab, Level – II, Kolhapur

Organisation Chart

**SUPRINTENDING ENGINEER,
HYDROLOGY PROJECT CIRCLE (DATA COLLECTION &
PLANNING) NASHIK**

**EXECUTIVE ENGINEER,
H.P.DIVISION, PUNE**

**ASST. EXECUTIVE ENGINEER-I H. P. SUB DIVISION,
KOLHAPUR**

GOVT. ANALYST

OPERATING AGENCY

CHIEF CHEMIST

ASSISTANT CHEMIST

Table showing No. of Location Covered under the jurisdiction of Water Quality Lab Level-II, Kolhapur.

Sr. no	Station	Name of River	Frequency of sampling	No. Of Samples
				2011- 12
KOLHAPUR DISTRICT				
1.	Radhanagari I	Bhogawati	Monthly	12
SANGLI DISTRICT				
1.	Mhaisal	Krishna	Monthly	12
2.	Shigaon	Warana	Monthly	12
SATARA DISTRICT				
1.	Ambwade	Yerala	Monthly	00
2.	Bhuinj	Krishna	Monthly	12
3.	Parli	Urmodi	Monthly	04
4.	Rasati	Koyana	Monthly	12
5.	Shivade	Krishna	Monthly	12
SOLAPUR DISTICT				
1.	Devikavathe	Bhima	Monthly	07
RATNAGIRI DISTRICT				
1.	Anjanari	Kajavi	Monthly	12
2.	Barewadi	Bav	Monthly	04
3.	Chatav	Jagbudi	Monthly	08
4.	Kumbharkhani	Gad	Monthly	12
5.	Latwan	Bharaja	Monthly	04
6.	Pastewadi	Kajavi	Monthly	08
7.	Pawarwadi	Bhambedi	Monthly	12
8.	Raipatan	Arjuna	Monthly	12
SINDHUDURGA DISTRICT				
1.	Araye	Achara	Monthly	12
2.	Banda	Terekhol	Monthly	12
3.	Baparde	Local Nala	Monthly	12
4.	Belane	Gad	Monthly	12
5.	Ghonsari-L	Devghar	Monthly	12
6.	Kerawade	Karli	Monthly	12
7.	Kudal	Bhansari	Monthly	12
8.	Shirshingi	Terekhol	Monthly	12
9.	Shivdav	Gad	Monthly	12

Total No. of Samples collected and analyzed during Reported Period (i.e. June 2011 to May 2012) = 263

CHAPTER - III

Methodology

Chapter - 3

Methodology

3.1 General:

Water, is the most essential element to life on earth, for survival of all living organisms. Water on earth is present in two forms i.e. fresh water & marine water. Fortunately almost the entire country is criss-crossed by rivers. Geographical area of the state is divided in five river basins viz. Godavari. Tapi, Narmada, Krishna and west flowing rivers in Konkan region.

In the last century the water sources increasingly polluted due to industrilization,m urbnization & population explision.

3.2 Aim and Objective

The Hydrology Project goals & main objectives of water quality monitoring in Krishna basin & West Flowing River Tapi from Konkan region are -

- Establish base line quality
- Observe the trend in water quality over a period of time
- To create public awareness as regards water pollution & its prevention.
- Surveillance over pollution through to water quality.

3.3 Monitoring Frequency

Previously the frequency of sample collection for Baseline Stations was once in a month and that of trend stations was twice in a month.

There has been change in the frequency of sample collection from August 2003 given below.

Base Line : Once in a month (June to September)

Trend stations : once in a month

Flux stations : Once in month

Reservoirs : Fortnightly

3.4 Sampling Details

The water samples were collected stations from the main flowing stream of river at depth of 30 cm from the surface. The samples thus collected were transported to the laboratory within 48 hours from the time of collection.

The samples collected in this lab from Kolhapur, Sangli, Satara, Ratnagiri and Sindhudurga district.

3.5 Methodology

Analysis of Physical and Chemical parameters is done in the laboratory on the basis of Standard Analytical Methods, Instrument Operating Instructions, APHA, 21st Ed., 2005.

Data analyzed further validated with prescribed method as per Water Quality Manuals to verify various Ratios manually and is entered in SWDES Software for Water Quality Data Entry. Further the data is sent to State Data Center for further dissemination to user end.

Furthermore to get an idea of about data generated for the period it is decided and instructed to analyzed the generated data for the said period in the form of Annual report with the help of various tools in SWDES Software to find out critical parameters and critical locations in the jurisdiction of this Lab.

The Annual Report is prepared for the year 2011 - 12 in combined. The Table below shows the number of sample analyzed during the reported period. In order to study water quality status station wise, all locations covered under this lab during the year 2011 - 2012 are considered.

TABLE SHOWING SAMPLES ANALYSED DURING THE REPORTING PERIOD

Sr. No.	Year	Baseline Sample	Flux Sample	Trend Sample	Dam Sample	Total
1.	2011- 12	8	12	155	12	187
Total Samples analyzed during reporting period						187

3.6 Flow Chart

The work of analysis of sample is being monitored on the basis of flow chart generated in the lab as per standard guidelines and analysis of sample is performed as per guidelines of world bank with APHA ,21 st Ed, 2005 as a standard procedure for analysis of samples.

As well refers BIS standards IS:10500 and other relevant BIS standards for analysis of various samples received from users for various purposes like Drinking, Irrigation, Ice preparation, Bathing (Swimming Tank),Construction, study and various Research & Development Activities.

FLOW CHART OF ANALYSIS OF HP WATER SAMPLE

Sample Collection from Sampling Source with the help of Depth Sampler

Treatment: D.O. Fixing, Preservation of MPN Sample, Colour, Odour Temp, pH, EC, tested on field, and fill up ID form.

At Laboratory: Inward the Sample, Giving the Sr. No. to the sample noted into sample entry register

ID form entry taken into SWEDS Software

Tests are carried out in lab as per Protocols. These tests are: Microbiological test, Chlorophyll-Temp, pH, EC, D.O., B.O.D, Ammonia, Nitrate, Nitrite, TDS, TSS, C.O.D., Turbidity, Alkalinity, Carbonate & Bicarbonate, Chloride, Fluoride, Boron, Iron, Sodium, Potassium, Total Hardness, Phosphorous, and Calcium etc.

Observations & calculations of all Analyzed Parameters are entered in the Data Sheet

The results of parameters are checked & validated

After Validation Check, all the data is entered in to Data Record and Validation Register

This data is finally entered in to SWEDS Software

Data sent to Executive Engineer, HDP Division, Nashik for further action

Methodology For the analysis of Water Quality samples the following parameters were analyzed during the Period 2011 - 12

Table showing List of parameters and the methodology used for the analysis.

Sr. No	Parameters	Methodology
1.	Colour	APHA, 21 st Ed., 2005, 2120-B, 2-2
2.	Odour	IS 3025 (Part 5): 1983, Reaffirmed 2006
3.	Temperature	APHA, 21 st Ed., 2005, 2550-B, 2-61
4.	pH	APHA, 21 st Ed., 2005, 4500-H ⁺ - B, 4-90
5.	Electric Conductivity	APHA, 21 st Ed., 2005, 2510- B, 2-47
6.	Dissolved Oxygen	IS 3025 (Part 38): 1989, Reaffirmed 2003
7.	Turbidity	APHA, 21 st Ed., 2005, 2130-B, 2-9
8.	Total Solids	IS 3025 (Part 15): 1984, Reaffirmed 2003, Amds.1
9.	Dissolved Solids	IS 3025 (Part 16): 1984, Reaffirmed 2006, Ed.2.1 (1999-12)
10.	Suspended Solids	IS 3025 (Part 17): 1984, Reaffirmed 2006, Amds.1
11.	NH ₃ -N	APHA, 21 st Ed., 2005, 4500-NH ₃ F, 4-110
12.	NO ₂ ⁻	APHA, 21 st Ed., 2005, 4500-NO ₂ -B, 4-118
13.	NO ₃ ⁻	APHA, 21 st Ed., 2005, 4500-NO ₃ , B -4 -120
14.	Total Phosphorous	APHA, 21 st Ed., 2005, 4500 P, E, 4-153
15.	Biochemical Oxygen Demand	IS 3025 (Part 44): 1993, Reaffirmed 2003, Amds.1
16.	Chemical Oxygen Demand	APHA, 21 st Ed., 2005, 5220-B, 5-15
17.	Potassium K ⁺	IS 3025 (Part 45): 1993, Reaffirmed 2003, Amds.1
18.	Sodium Na ⁺	IS 3025 (Part 45):1993, Reaffirmed 2003, Amds.1
19.	Calcium Ca ⁺⁺	APHA, 21 st Ed., 2005, 3500-B, 3-65
20.	Magnesium Mg ⁺⁺	APHA, 21 st Ed., 2005, 3500-Mg, B, 3-84
21.	Iron (as Fe)	APHA, 21 st Ed., 2005, 3111-B, 3-17
22.	Carbonate CO ₃	APHA, 21 st Ed., 2005, 2320-B, 2-27, 5 -1 & 4500-CO ₂ -D, 4-34
23.	Bi-Carbonate H CO ₃	APHA, 21 st Ed., 2005, 2320-B, 2-27, 5 -3 & 4500-CO ₂ -D, 4-34
24.	Chloride Cl	APHA, 21 st Ed., 2005, 4500-Cl, B, 4-70
25.	Fluoride F	APHA, 21 st Ed., 2005, 4500-F ⁻ , D, 4-85
26.	Boron B	APHA, 21 st Ed., 2005, 4500-B-C, 4-23

27.	Total Coliforms	APHA, 21 st Ed., 2005, 9221-B, 9-49
28.	Faecal Coliforms	APHA, 21 st Ed., 2005, 9221-E, 9-56
29.	Alkalinity	IS 3025 (Part 23): 1986, Reaffirmed 2003, Amds.1

Annual Report
On Water Quality Monitoring through Water Quality Lab Level –II ,
Kolhapur for the Year 2011- 12

TABLE SHOWING SAMPLES ANALYSED DURING THE REPORTING PERIOD

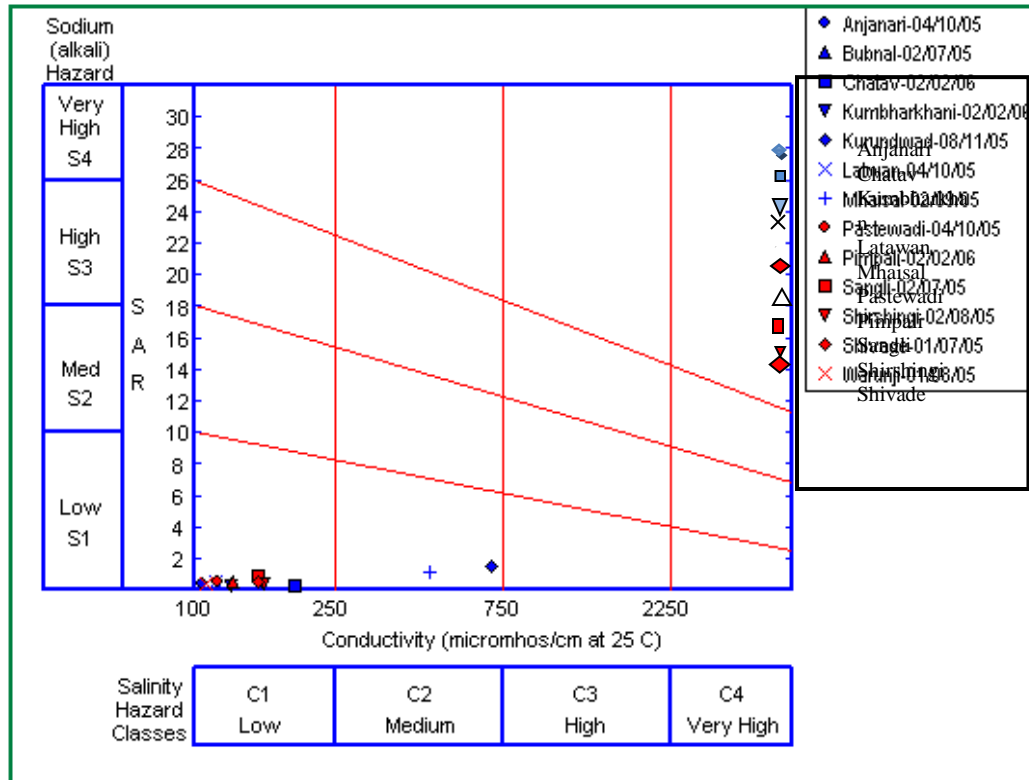
Sr. No.	Year	Baseline Sample	Flux Sample	Trend Sample	Dam Sample	Total
1.	2011 - 12	8	12	155	12	187
Total Samples analyzed during reporting period						187

CHAPTER - IV

Result & Observation

Chapter - 4 Result & Observation

Wilcox Diagram



**Table 1 -Classification of location on the basis of Wilcox technique
towards use of water for irrigation purpose**

Sr. No.	Name of Location	Year	Class as per Wilcox technique	Recommendation
I. Krishna River				
1.	Bhuinj	2011- 12	C2 & S1	Water is suitable for Irrigation purpose.
2.	Mhaisal	2011- 12	C2 & S1	Water is suitable for Irrigation purpose.
3.	Shivade	2011- 12	C2 & S1	Water is suitable for Irrigation purpose.
III. Urmodi River				
1.	Parli	2011- 12	C1 & S1	Water is good for Irrigation purpose.
IV. Koyana River				
1.	Rasati	2011- 12	S1	Unable to classify because of inadequate data
V. Warana River				
1.	Shigaon	2011- 12	S1	Unable to classify because of inadequate data

Sr. No.	Name of Location	Year	Class as per Wilcox Technique	Recommendation
VII. West Flowing River (WFR)Konkan				
1.	Araye	2011- 12	S1	Unable to classify because of inadequate data
2.	Anjanari	2011- 12	S1	Unable to classify because of inadequate data
3.	Banda	2011- 12	C1 & S1	Water is good for Irrigation purpose
4.	Baparde	2011- 12	-	Unable to classify because of inadequate data
5.	Barewadi	2011- 12	S1	Unable to classify because of inadequate data
6.	Belane	2011- 12	C1 & S1	Water is good for Irrigation purpose
7.	Chatav	2011- 12	S1	Unable to classify because of inadequate data
8.	Ghonsari – L	2011- 12	S1	Unable to classify because of inadequate data

9.	Kerwade	2011- 12	C1 & S1	Water is good for Irrigation purpose
10.	Kudal	2011- 12	S1	Unable to classify because of inadequate data
11.	Kumbharkhani	2011- 12	S1	Unable to classify because of inadequate data
12.	Latwan	2011- 12	C1 & S1	Water is good for Irrigation purpose
13.	Pastewadi	2011- 12	C1 & S1	Water is good for Irrigation purpose
14.	Pawarwadi	2011- 12	S1	Unable to classify because of inadequate data
16.	Raipatan	2011- 12	S1	Unable to classify because of inadequate data
17.	Shirshingi	2011- 12	C1 & S1	Water is good for Irrigation purpose
18.	Shivdav	2011- 12	C1 & S1	Water is good for Irrigation purpose
VIII. Dam location				
1.	Radhanagari	2011- 12	S1	Unable to classify because of inadequate data

Table 2 - Observation on the basis of classification of location

Sr. No.	River	Year	Observation
1.	Krishna River	2011- 12	Along the Krishna river there are 5 locations & as per above classification (table – 1) it shows that out of 5 location 4 location such as Bhuinj, Mhaisal, Bubnal & shivade having suitable water for irrigation purpose without any treatment. Sangli (ankali bridge) having a good water for irrigation purpose.
2.	Panchganga River	2011- 12	Kurundwad & Wadange these 2 locations comes under Panchganga river. As per above classification (table – 1) it show that. Water is good for irrigation purpose at both the locations.
3.	Urmodi River	2011- 12	Only one location comes under river Urmodi that is Parali. As per above classification (table - 1) there water is good for irrigation purpose.
4.	Koyana River	2011- 12	Along the Koyana river there are 2 location namely Rasati & Warunji. Both location water sample unable to classify because of inadequate data.
5.	Warana River	2011- 12	There is only one location such as Shigaon. There water sample unable to classify because of inadequate data.
6.	West Flowing River Konkan	2011- 12	Along Waste flowing river there are 18 locations and as per above (table - 1) classification it shows that out of 18 locations 10 locations such as Araye, Anjanari, Baparde, Barewadi, Chatav, Ghonsari – (L). Kudal, Kumbharkhani, Pawarwadi, Raipatan, there water is unable to classify because of inadequate data. And remaining 8 locations i.e. Banda, Belane, Kerwade, Latwan Pastewadi Pimpili, Shirshingi & Shivdav having water is good for irrigation purpose.
7.	Dam Location	2011- 12	1 locations goes under dam i. e. Radhanagari and as per above (Table - 1) classification it shows that there water is unable for classification because of inadequate data.

Table 3 - Abstract for classification of water towards Irrigation purpose

Sr. No.	Year	Good for irrigation	Suitable for irrigation	Suitable for salt tolerant plant	Inadequate data	Total
1.	2011- 12	12	5	0	14	31

Data Abstract For 2011 – 12

Table - 1											KOLHAPUR DISTRICT										
Parameter	Unit	Season																			
		Monsoon			Winter			Summer													
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean											
Station : Radhanagari																					
DO	mg/L	7.2	7.3	7.2	7.2	7.8	7.45	6.8	7.8	7.2											
BOD	mg/L	1	1	1	1	1	1	1	1.2	1.1											
COD	mg/L	4	7	5.5	6	8	7	7	7	7											
Total coliforms	MPN/100 ml	12	20	17.5	14	24	20.25	10	23	13.75											
Total Dissolved Solids	mg/L	22	48	32	26	54	38	20	34	25											

Table - 2		SANGLI DISTRICT								
Parameter	Unit	Season								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station : Shigaon										
DO	mg/L	6.8	7.6	7.2	6	7.2	6.6	6.8	7	7
BOD	mg/L	1.2	1.4	1.2	1	1.2	1.05	1.4	1	1.1
COD	mg/L	7	13	9.5	5	8	6.5	5	13	8.5
Total coliforms	MPN/100 ml	407	700	591.75	1300	2100	1600	430	480	625
Total Dissolved Solids	mg/L	68	124	100.5	68	158	102.5	52	78	62
Station : Mhaisal										
DO	mg/L	7.2	7.8	7.45	6.8	7.4	7.1	7	7.4	7.2
BOD	mg/L	1.2	1.4	1.2	1	1.2	1.15	1	1.2	1.15
COD	mg/L	9	12	11	9	10	9.5	6	12	9.5
Total coliforms	MPN/100 ml	380	110	585	580	1700	1080	430	480	465
Total Dissolved Solids	mg/L	102	342	207.5	256	378	320	148	312	221

Table - 3		SATARA DISTRICT								
Parameter	Unit	Season								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station: Bhuinj										
DO	mg/L	6.6	7.2	7	6.4	7.8	7.05	6.8	7.2	6.95
BOD	mg/L	1	1.2	1.1	1	1	1	1	1.2	1.1
COD	mg/L	6	9	7.5	5	7	5.5	5	8	6.5
Total coliforms	MPN/100 ml	330	1200	827.5	840	1700	1235	940	1400	1135
Total Dissolved Solids	mg/L	256	478	391	236	354	290.5	86	428	269
Station: Parli										
DO	mg/L	6.4	7.2	6.8	7	7	7	0	0	0
BOD	mg/L	1	1.2	1.1	1	1	1	0	0	0
COD	mg/L	6	7	6.33	7	7	7	0	0	0
Total coliforms	MPN/100 ml	1100	1700	1366.6	700	700	700	0	0	0
Total Dissolved Solids	mg/L	98	221	145	120	120	120	0	0	0
Station: Shivade										
DO	mg/L	7	7.8	7.4	7	7.6	7.4	7	7.4	7.2
BOD	mg/L	1	1.2	1.1	1	1.2	1.1	1	1.2	1.15
COD	mg/L	6	8	7	4	10	6.5	2	6	4.45
Total coliforms	MPN/100 ml	410	1200	755	940	1700	1235	840	1200	1020
Total Dissolved Solids	mg/L	154	358	284	194	398	259	172	342	290
Station : Rasati										
DO	mg/L	5.6	7.4	6.6	6.8	7.4	7	6.8	7	6.8
BOD	mg/L	1	1	1	1	1	1	1	1	1
COD	mg/L	4	6	5.25	5	6	5.5	5	5	5
Total coliforms	MPN/100 ml	210	390	290	330	470	398	330	390	358
Total Dissolved Solids	mg/L	38	62	48.2	48	62	55	28	86	54.2

Station : Ambawade

DO	mg/L	0	0	0	0	0	0	0	0	0
BOD	mg/L	0	0	0	0	0	0	0	0	0
COD	mg/L	0	0	0	0	0	0	0	0	0
Total coliforms	MPN/100 ml	0	0	0	0	0	0	0	0	0
Total Dissolved Solids	mg/L	0	0	0	0	0	0	0	0	0

Table - 4

RATNAGIRI DISTRICT

Parameter	Unit	Season								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station : Latwan										
DO	mg/L	5.8	6.2	6	0	0	0	0	0	0
BOD	mg/L	1	1	1	0	0	0	0	0	0
COD	mg/L	3	7	5	0	0	0	0	0	0
Total coliforms	MPN/100 ml	2800	3500	3325	0	0	0	0	0	0
Total Dissolved Solids	mg/L	66	102	86	0	0	0	0	0	0
Station : Chatav										
DO	mg/L	7.4	7.6	7.5	7	7.6	7.35	0	0	0
BOD	mg/L	1	1	1	1	1	1	0	0	0
COD	mg/L	7	9	7.75	8	10	8.75	0	0	0
Total coliforms	MPN/100 ml	940	1200	1085	580	840	630	0	0	0
Total Dissolved Solids	mg/L	50	74	61.5	32	48	43.5	0	0	0
Station : Kumbharkhani										
DO	mg/L	7	7.4	7.25	7.2	7.8	7.5	5.6	5.6	5.6
BOD	mg/L	1	1	1	1	1	1	1.2	1.2	1.2
COD	mg/L	8	10	9	7	8	7.75	8	8	8
Total coliforms	MPN/100 ml	940	1400	1160	700	1100	895	940	940	940
Total Dissolved Solids	mg/L	54	72	60.5	58	76	70	72	72	72

Station : Pastewadi

DO	mg/L	7.4	7.6	7.5	7.4	8.2	7.75	0	0	0
BOD	mg/L	1	1	1	1	1	1	0	0	0
COD	mg/L	8	10	8.5	7	8	7.75	0	0	0
Total coliforms	MPN/100 ml	1700	2800	2225	1100	3500	2125	0	0	0
Total Dissolved Solids	mg/L	56	78	70	38	68	56.5	0	0	0

Station : Raipatan

DO	mg/L	6.8	7.4	7.15	7	7.8	7.5	6.1	7.2	6.83
BOD	mg/L	1	1.6	1.15	1	1	1	1	1.4	1.5
COD	mg/L	6	12	8.5	8	9	8.5	8	9	8.25
Total coliforms	MPN/100 ml	2200	3500	3000	1700	2200	1950	1100	1700	1425
Total Dissolved Solids	mg/L	44	66	58.5	48	64	56.5	36	62	50.5

Station : Pawarwadi

DO	mg/L	7.2	7.8	7.5	7.6	8	7.8	7	8.4	7.45
BOD	mg/L	1	1.2	1.05	1	1	1	1	1.2	1.1
COD	mg/L	6	9	7.25	9	10	9.5	8	10	8.75
Total coliforms	MPN/100 ml	2400	2800	2600	110	1700	922.5	630	940	777.5
Total Dissolved Solids	mg/L	44	47	56.5	36	52	41	36	58	47.5

Station : Anjanari

DO	mg/L	7	7.4	7.25	6.8	7.6	7.25	5.7	7.4	6.83
BOD	mg/L	1	1.2	1.05	1	1	1	1	1.2	1.05
COD	mg/L	8	10	9.25	7	9	8	8	10	8.75
Total coliforms	MPN/100 ml	1400	1700	1525	1100	1700	1325	630	940	742.5
Total Dissolved Solids	mg/L	66	72	69	38	90	65	66	120	90

Station : Barewadi

DO	mg/L	7.2	7.6	7.35	0	0	0	0	0	0
BOD	mg/L	1	1	1	0	0	0	0	0	0
COD	mg/L	4	7	5.25	0	0	0	0	0	0
Total coliforms	MPN/100 ml	1700	2200	2025	0	0	0	0	0	0
Total Dissolved Solids	mg/L	48	64	54.5	0	0	0	0	0	0

Table - 5		SINDHUDURGA DISTRICT								
Parameter	Unit	Season								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station : Shirshingi										
DO	mg/L	7.2	7.6	7.45	7.6	8.2	7.8	6.2	7.8	7.63
BOD	mg/L	1	1.2	1.05	1	1	1	1	1.4	1.2
COD	mg/L	8	10	8.75	6	9	8	7	8	7.67
Total coliforms	MPN/100 ml	580	1500	1145	1100	1500	1200	840	940	890
Total Dissolved Solids	mg/L	46	78	62.5	52	96	67	64	92	82
Station : Kerwade										
DO	mg/L	6.4	7.4	7.1	7.4	8	7.7	6.2	7.6	7
BOD	mg/L	1	1.8	1.2	1	1.4	1.15	1	1.2	1.05
COD	mg/L	7	10	9	7	9	8	8	9	8.25
Total coliforms	MPN/100 ml	1100	2800	2100	1100	2400	1650	470	840	630
Total Dissolved Solids	mg/L	38	64	49.5	38	52	47	48	84	71.5
Station : Shivdav										
DO	mg/L	7.2	7.6	7.4	6.8	7.4	7.2	6.2	7.5	6.73
BOD	mg/L	1	1.2	1.05	1	1.2	1.05	1	1.4	1.15
COD	mg/L	6	10	7.75	8	9	8.25	8	9	8.25
Total coliforms	MPN/100 ml	330	1400	942.5	840	1200	980	890	940	765
Total Dissolved Solids	mg/L	50	66	60.5	46	60	53.5	64	96	78.5
Station : Ghonsari- L										
DO	mg/L	6.8	7.8	7.3	7.2	7.8	7.45	6.2	8.6	7.33
BOD	mg/L	1	1	1	1	1	1	1	1.2	1.05
COD	mg/L	7	10	9	8	9	8.75	8	9	8.75
Total coliforms	MPN/100 ml	700	2800	2100	1100	2400	1650	470	840	630
Total Dissolved Solids	mg/L	32	54	47.5	28	46	34.5	30	40	35.5

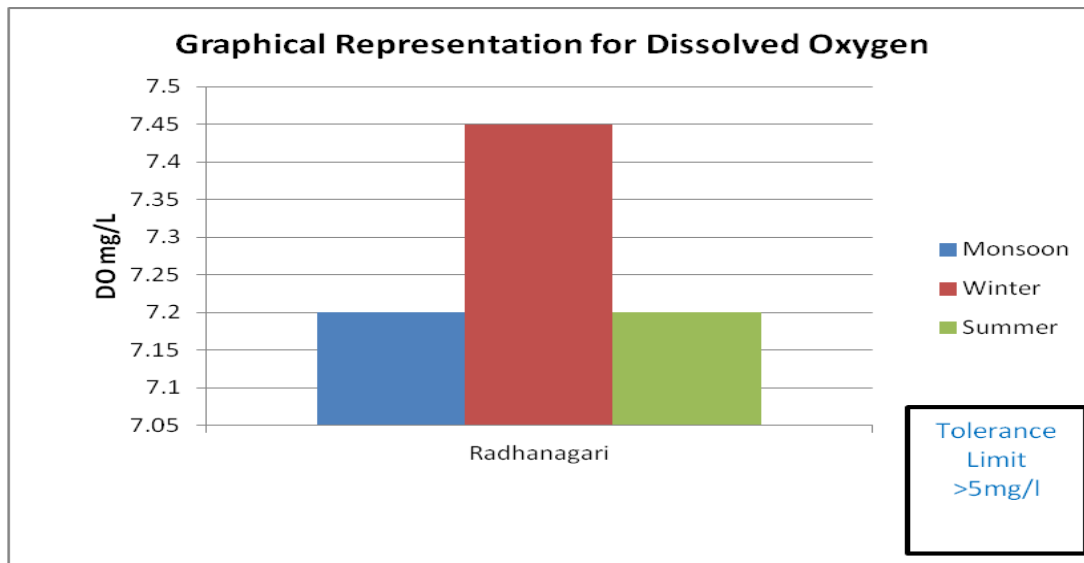
Station : Banda										
DO	mg/L	6.8	7.4	7.1	6.8	7.6	7.2	6.3	7.9	7
BOD	mg/L	1	1	1	1	1.4	1.15	1	1.4	1.2
COD	mg/L	6	9	7.5	8	9	8.25	8	9	8.75
Total coliforms	MPN/100 ml	630	940	826.5	1100	1700	1475	840	1500	1095
Total Dissolved Solids	mg/L	38	56	47	30	72	57	74	110	91.5
Station : Kudal										
DO	mg/L	6.6	7	6.8	6.6	7	6.85	6.8	7.7	7.33
BOD	mg/L	1	1.4	1.1	1	1.2	1.05	1	1.2	1.05
COD	mg/L	6	11	8.5	7	9	8.5	7	8	7.5
Total coliforms	MPN/100 ml	2100	200	2175	790	2100	1347.5	630	840	700
Total Dissolved Solids	mg/L	42	68	54	34	56	47	42	90	62.5
Station : Belane										
DO	mg/L	6.8	7.4	7.25	6.6	6.2	6.85	5.6	7.2	6.6
BOD	mg/L	1	1.4	1.1	1	1.2	1.05	1	1.2	1.1
COD	mg/L	7	11	8.75	7	8	7.75	7	8	7.75
Total coliforms	MPN/100 ml	460	480	675	580	1100	805	840	1200	1020
Total Dissolved Solids	mg/L	50	72	59	46	90	64.5	68	86	79.5
Station : Araye										
DO	mg/L	6.4	7	6.75	6.6	6.8	6.75	5.3	7.4	6.45
BOD	mg/L	1	1	1	1	1	1	1	1.4	1.2
COD	mg/L	6	9	7.5	6	9	7.75	8	8	8
Total coliforms	MPN/100 ml	330	1100	802.5	1300	2200	1750	940	1400	1160
Total Dissolved Solids	mg/L	26	48	35	30	38	34	34	40	38
Station : Baparde										
DO	mg/L	6.8	7.4	7.1	6.8	7.6	7.25	5.5	6.8	6.1
BOD	mg/L	1	1	1	1	1	1	1	1.4	1.13
COD	mg/L	6	9	7.75	8	9	8.25	8	10	9
Total coliforms	MPN/100 ml	1200	2100	1600	1700	3500	2600	1400	200	1766.7
Total Dissolved Solids	mg/L	26	36	30.5	26	42	33.5	40	74	60.6

Table – 6 SOLAPUR DISTRICT										
Parameter	Unit	Season								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station : Devikavate										
DO	mg/L	7	7.4	7.2	7	7.2	7.1	0	0	0
BOD	mg/L	1.2	1.6	1.45	1.2	1.4	1.3	0	0	0
COD	mg/L	12	14	12.75	8	14	11.33	0	0	0
Total coliforms	MPN/100 ml	940	2800	1885	480	630	563.3	0	0	0
Total Dissolved Solids	mg/L	684	1568	937	768	968	853.3	0	0	0

PART I: RESULT OBTAINED DURING 2011-2012

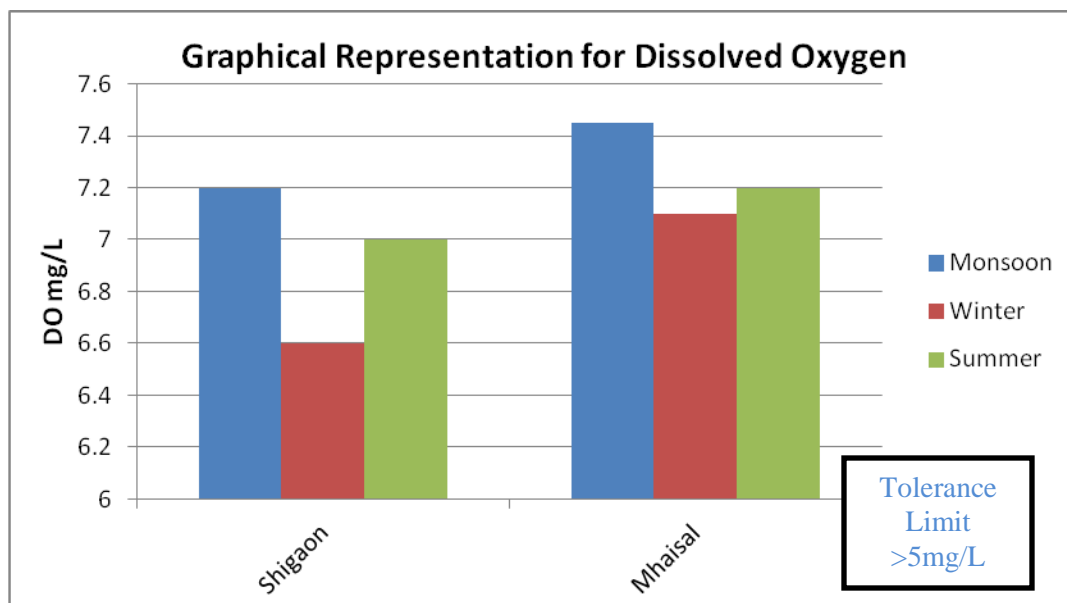
A) Dissolved Oxygen

1) Kolhapur District



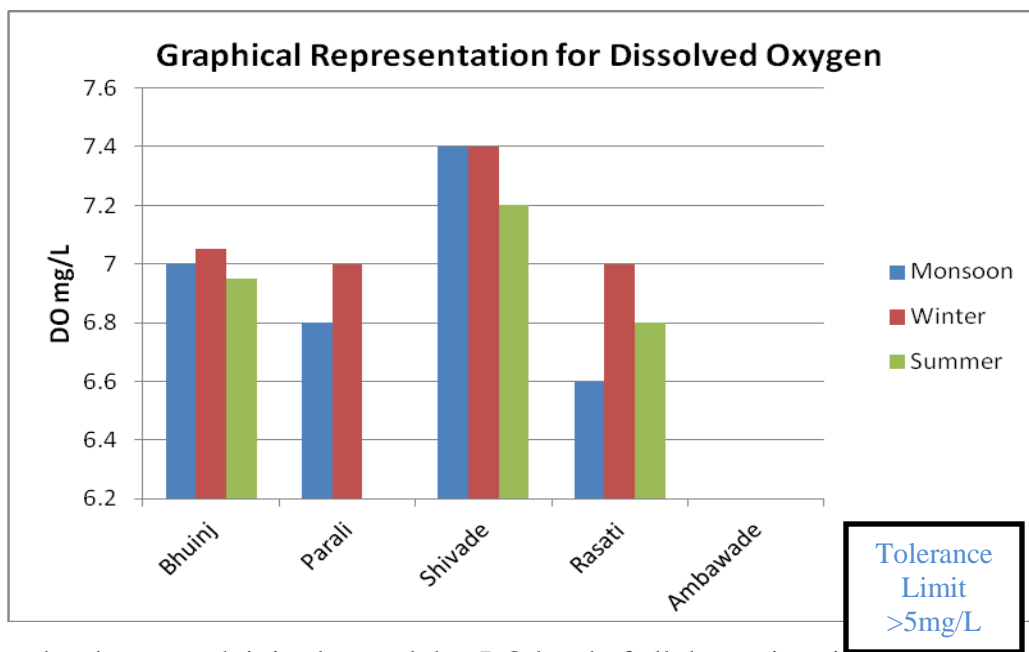
From the above graph it is observed that DO level of Radhanagari is within tolerance limit during all the seasons.

2) Sangli District



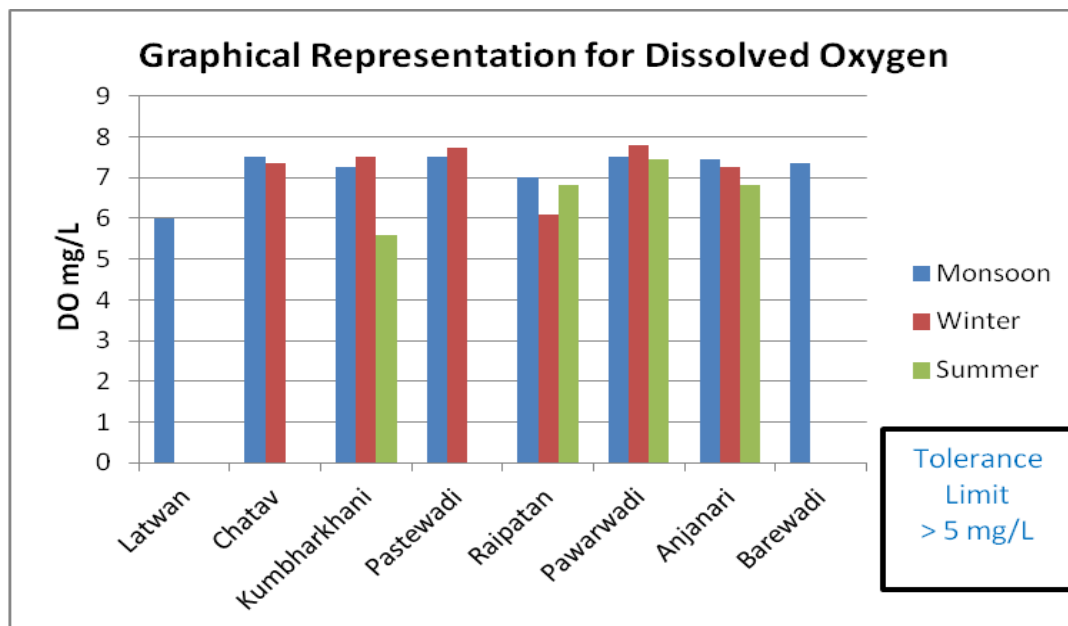
From the above graph it is observed that DO level of all the stations is within limit.

3) Satara District



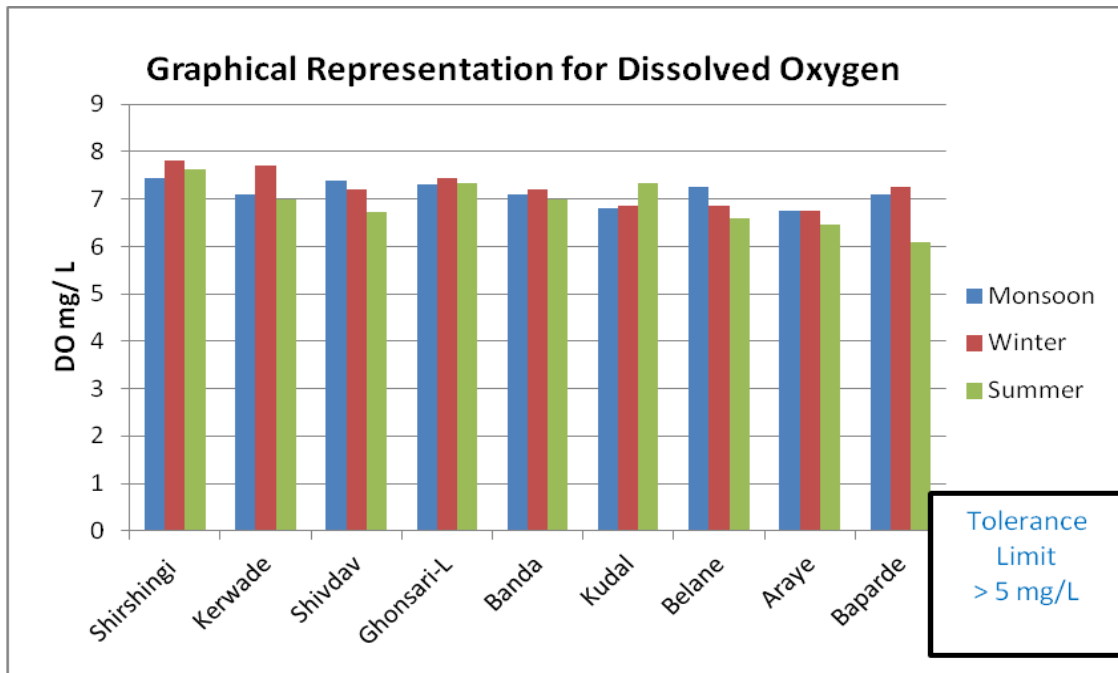
From the above graph it is observed that DO level of all the stations is within limit.

4) Ratnagiri District



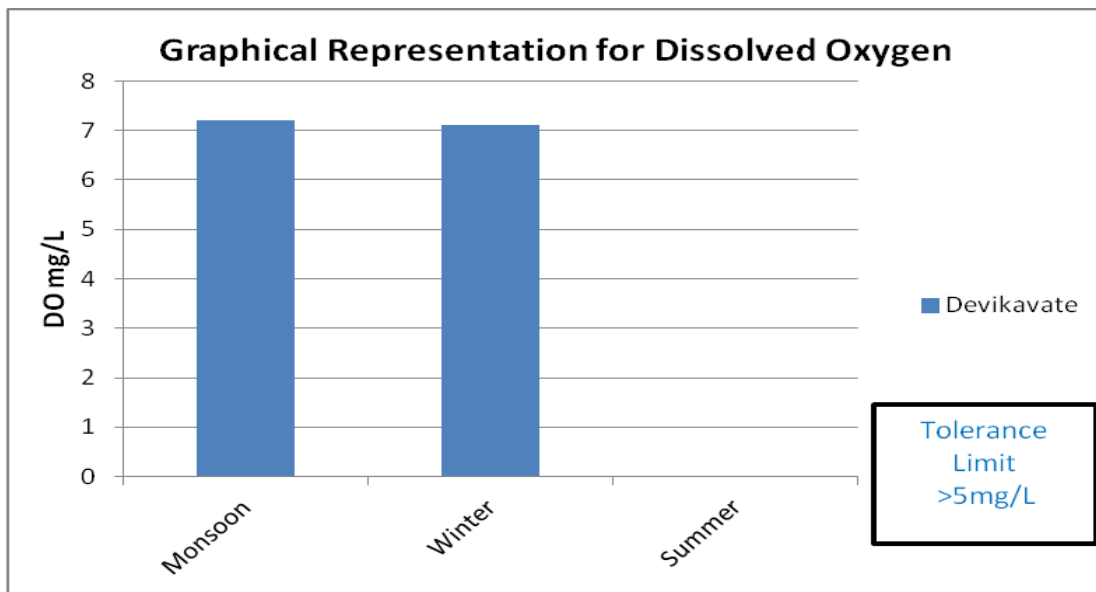
From the above graph it is observed that DO level of all the stations is within limit.

5) Sindhudurga District



From the above graph it is observed that DO level of all the stations is within limit.

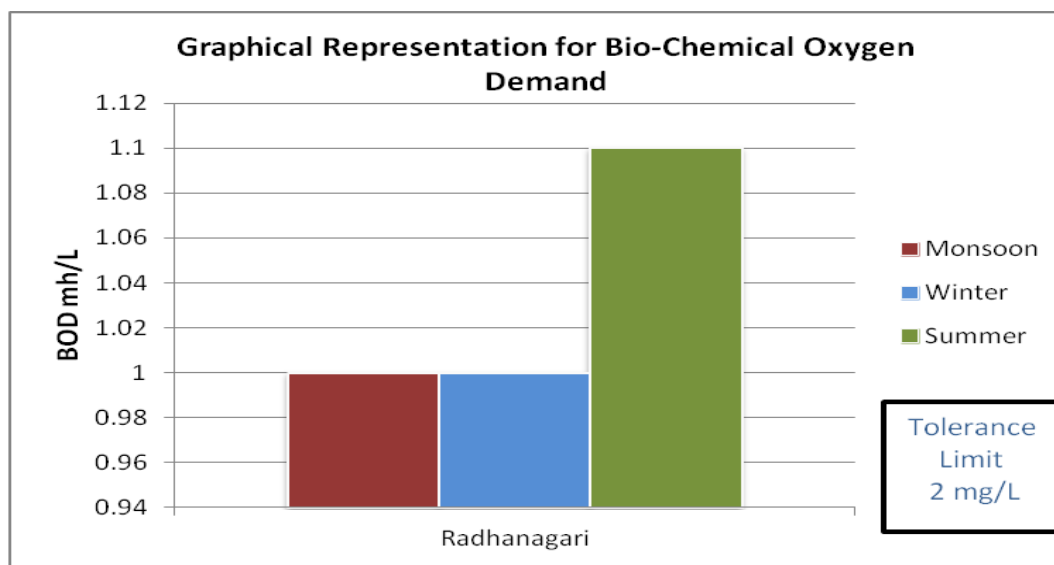
6) Solapur District



From the above graph it is observed that DO level of Devikavate stations exceeds the limit during monsoon & winter.

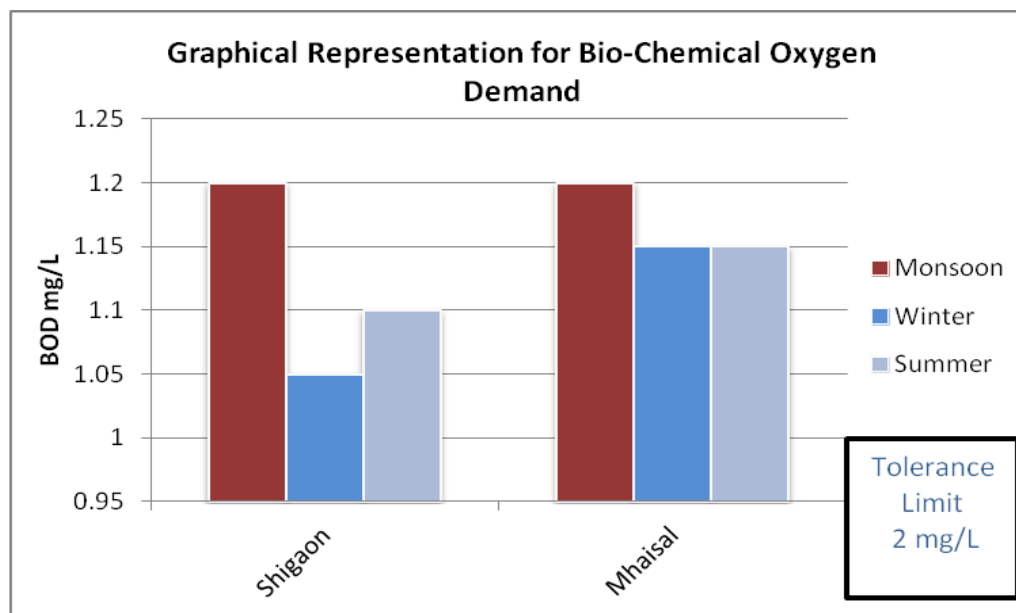
B) Bio-Chemical Oxygen Demand

1) Kolhapur District



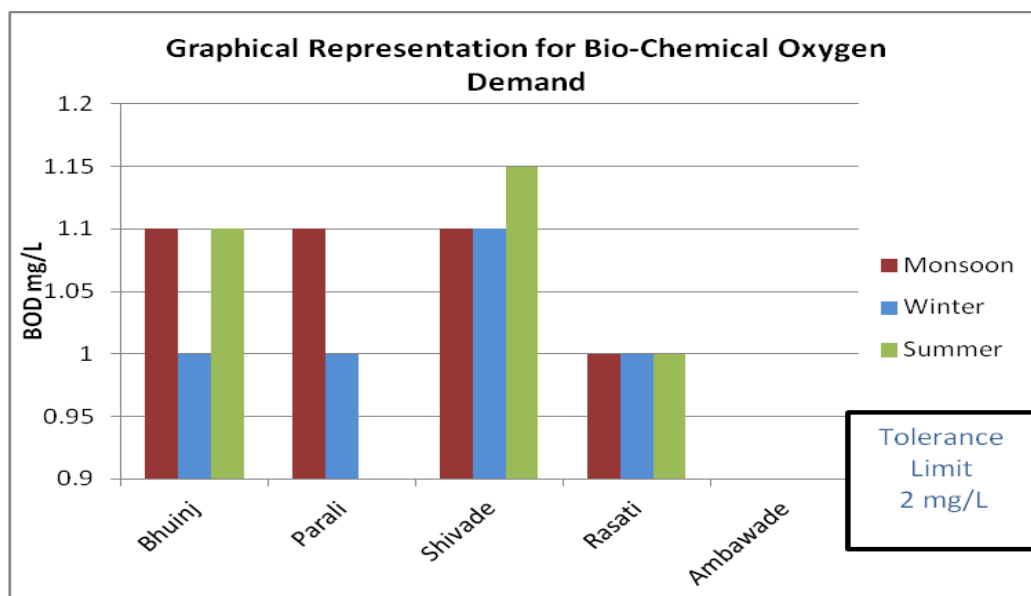
From the above graph it is observed that BOD level of Radhanagari station is within limit.

2) Sangli District



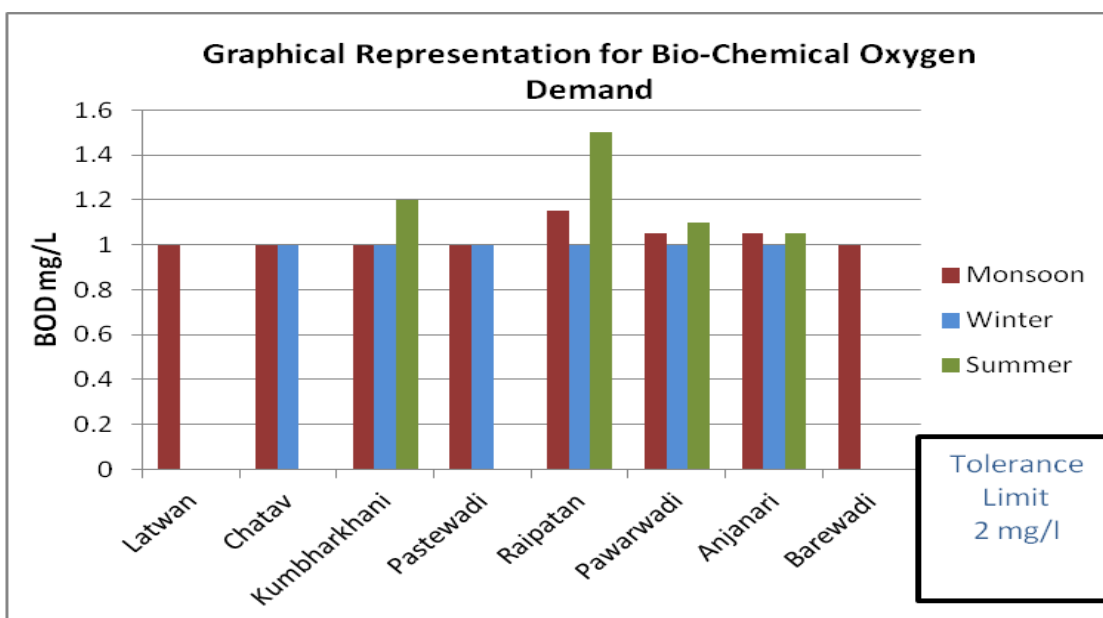
From the above graph it is observed that BOD level is within desirable limit for all the stations.

3) Satara District



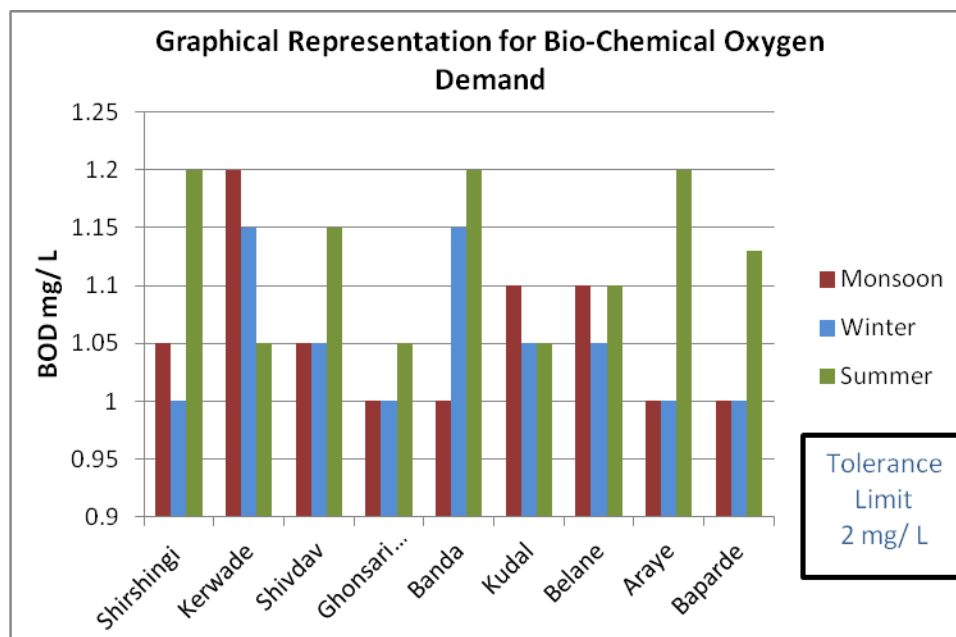
From the above graph it is observed that BOD level is within desirable limit for all the stations.

4) Ratnagiri District



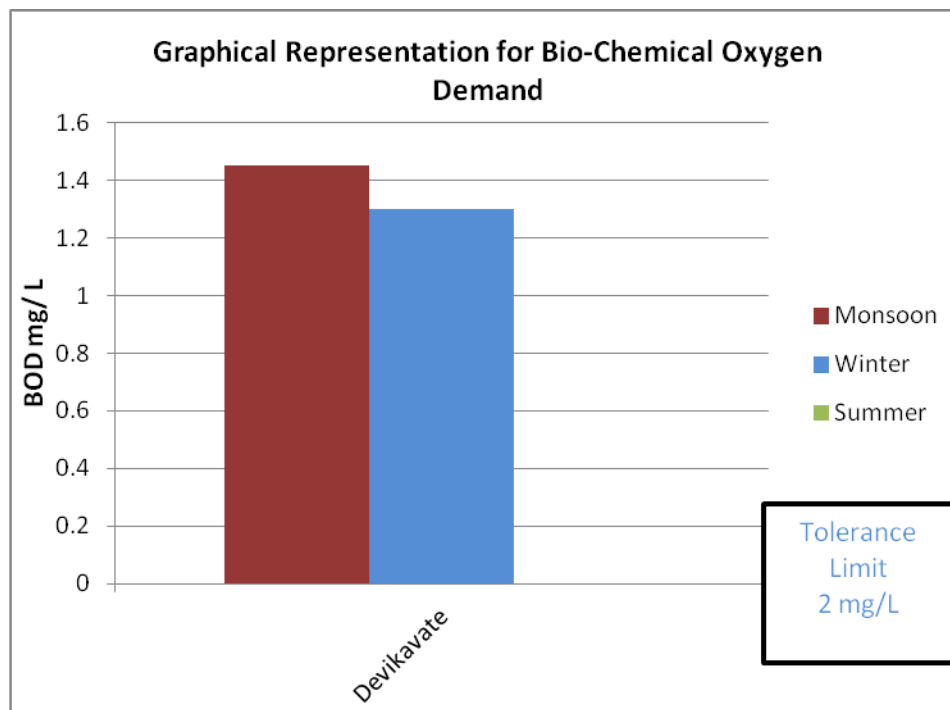
From the above graph it is observed that BOD level is within desirable limit for all the stations.

5) Sindhudurga District



From the above graph it is observed that BOD level is within desirable limit for all the stations.

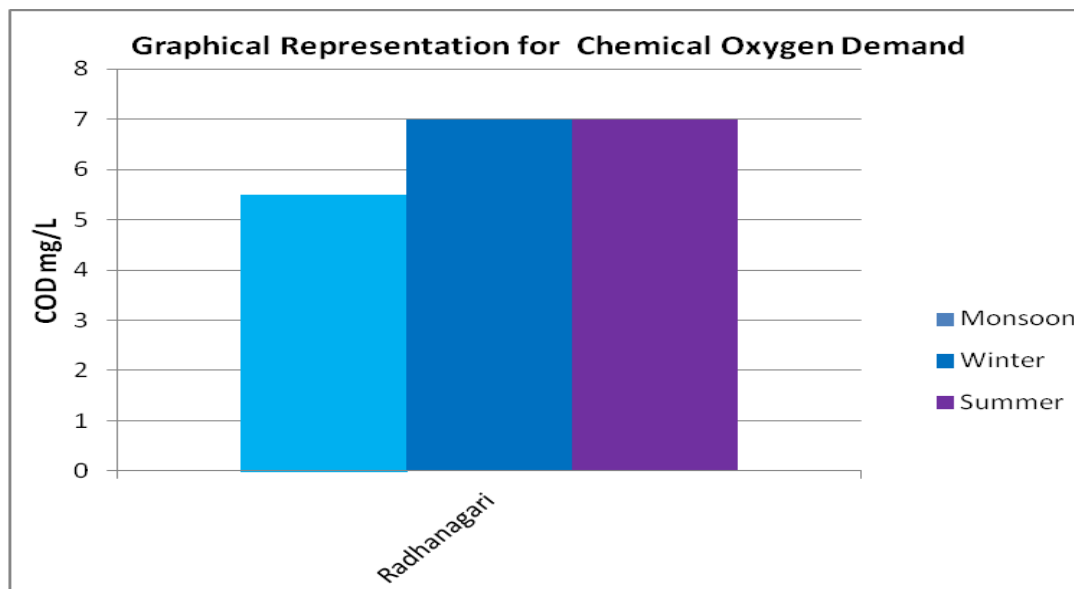
6) Solapur District



From the above graph it is observed that BOD level is within desirable limit for Devikavathe stations.

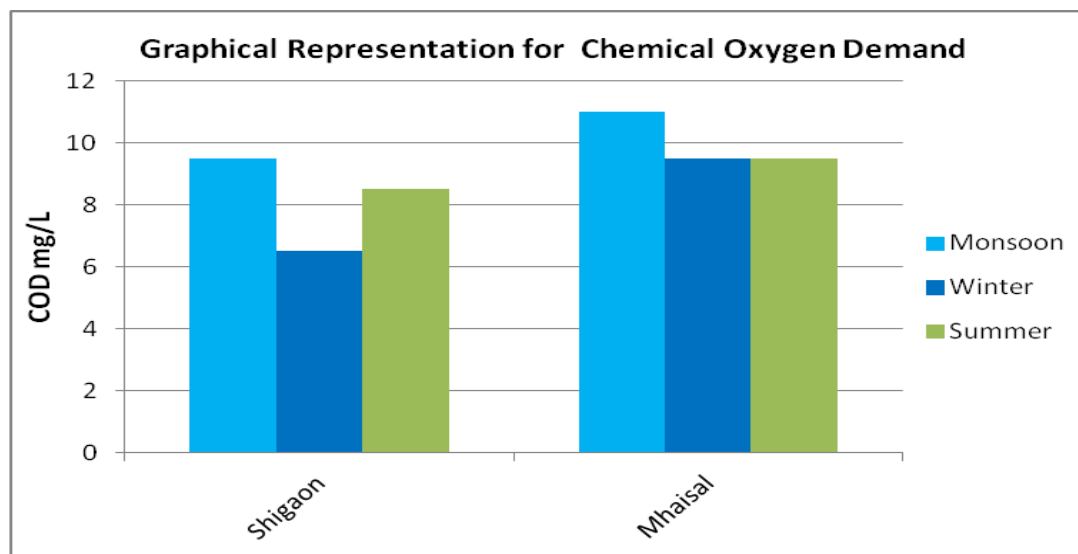
C) Chemical Oxygen Demand

1) Kolhapur District



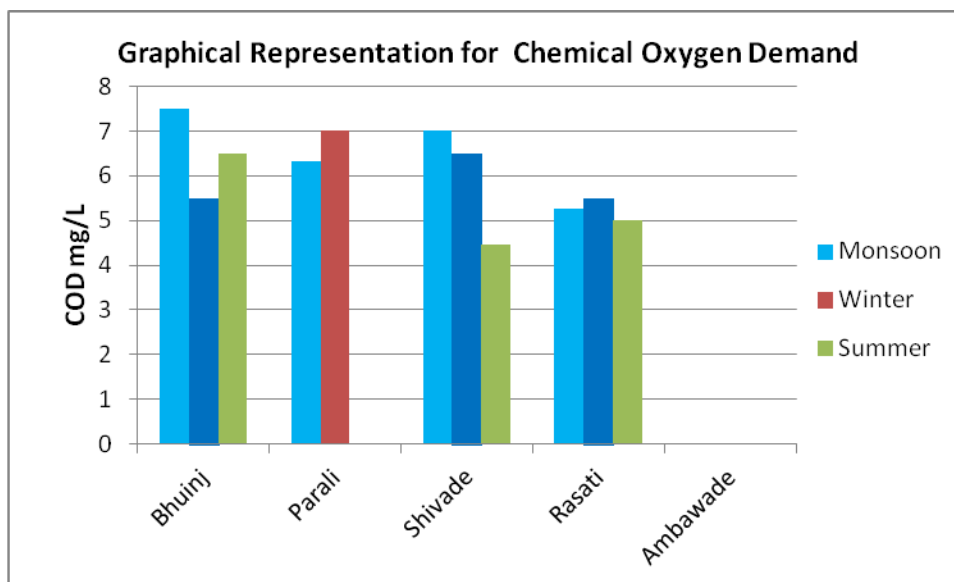
From the above graph it is observed that Radhanagari station shows COD level between 3 to 8mg/L.

2) Sangli District



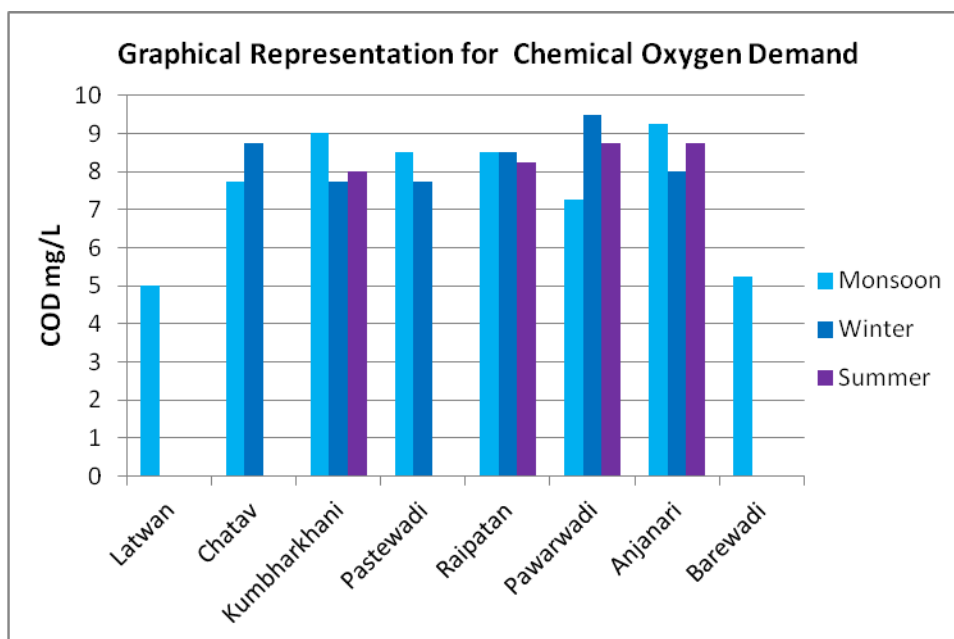
From the above graph it is observed that COD level of all station are shows high during all seasons.

3) Satara District



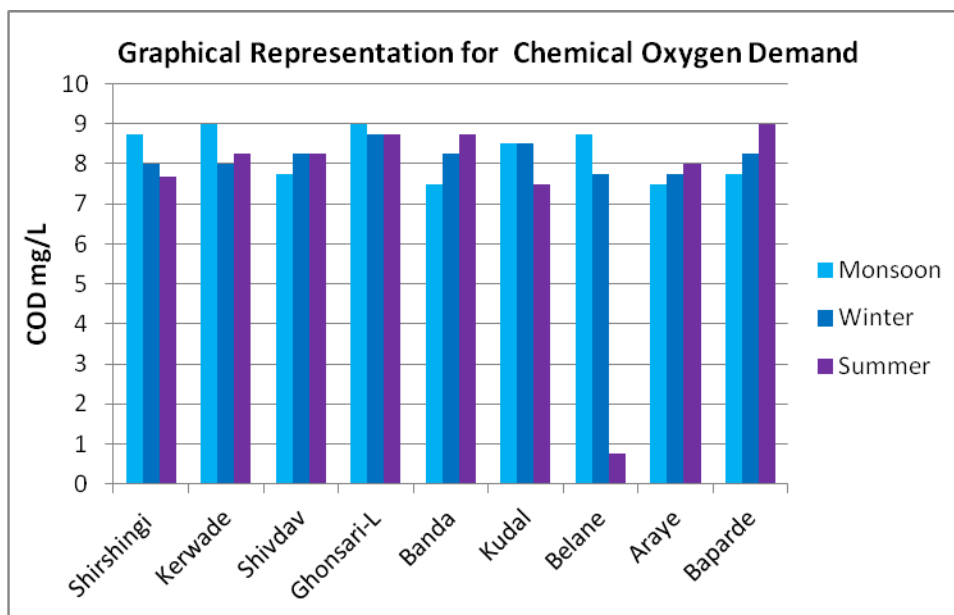
From the above graph it is observed that COD level of all station shows high during all season.

4) Ratnagiri District



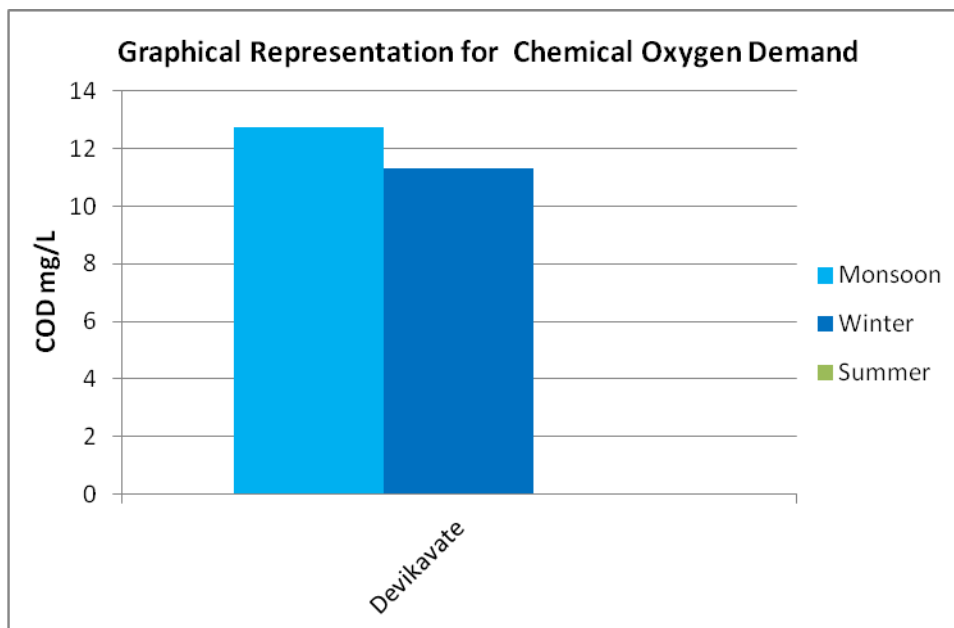
From the above graph it is observed that COD level of all station above 4 mg/L in all seasons.

5) Sindhudurga District



From the above graph it is observed that COD level of all station shows high during all season.

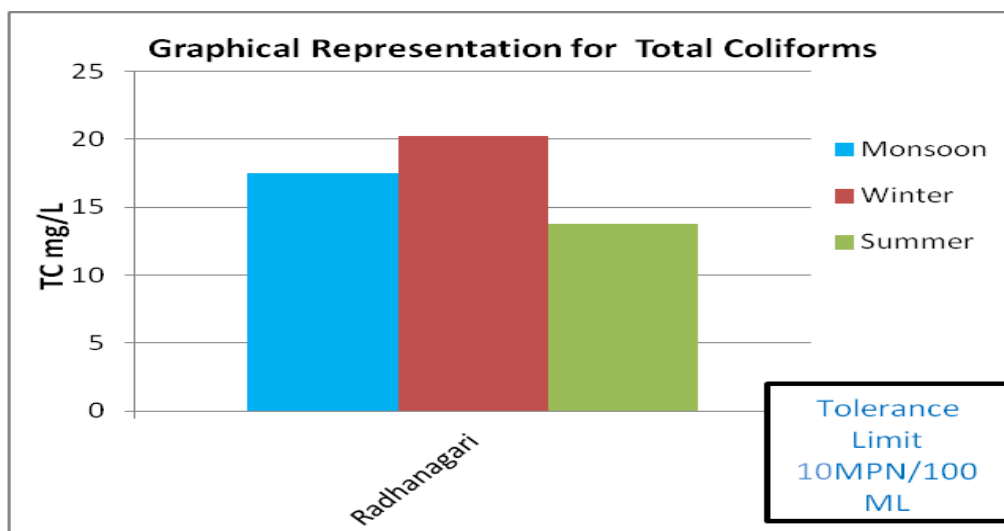
6) Solapur District



From the above graph it is observed that COD level shows high during all seasons for Devikavathe.

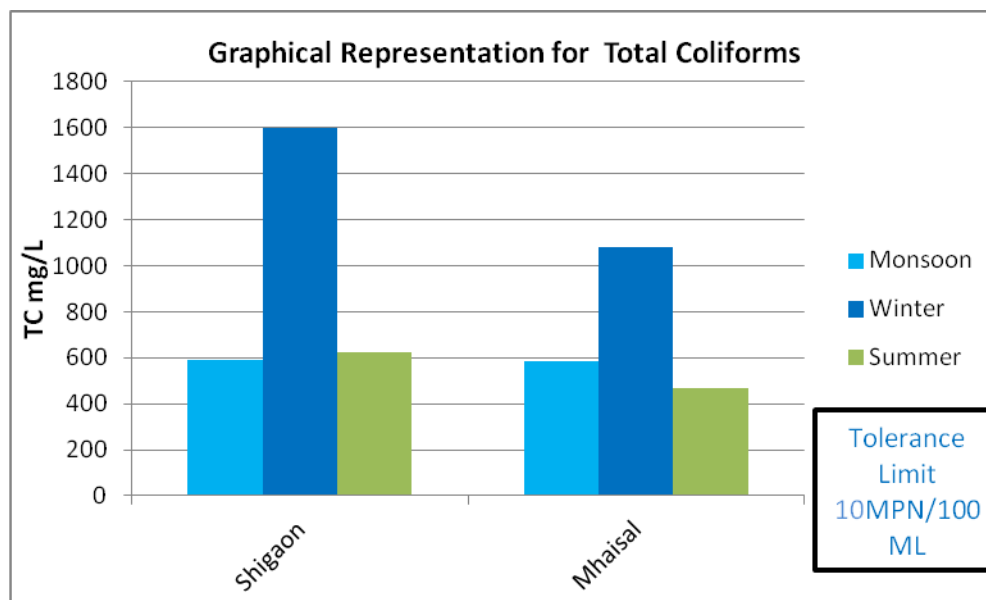
D) Total Coliforms (TC)

1) Kolhapur District



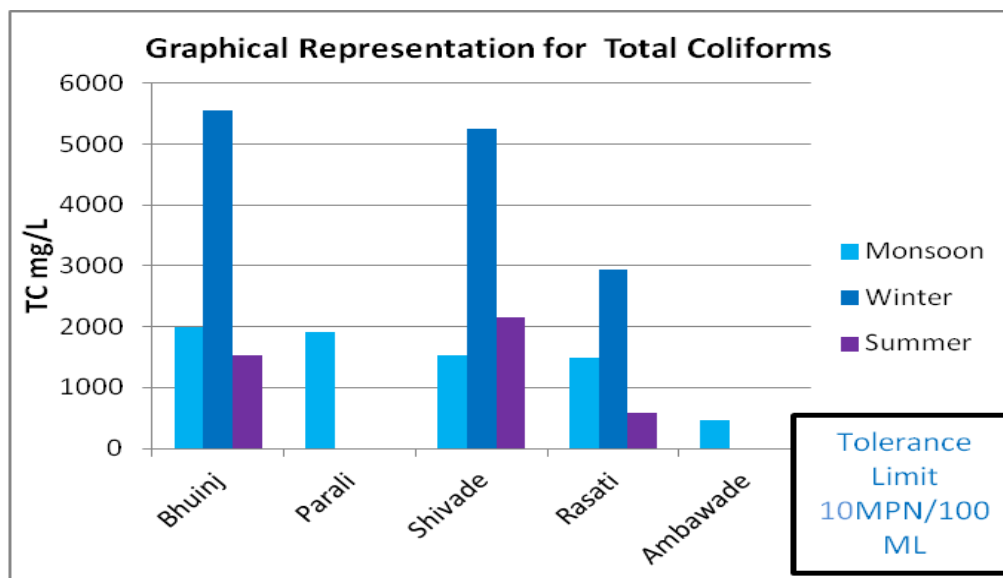
From the above graph it is observed that Radhanagari station shows high bacterial count i.e. above the tolerance limit during all seasons.

2) Sangli District



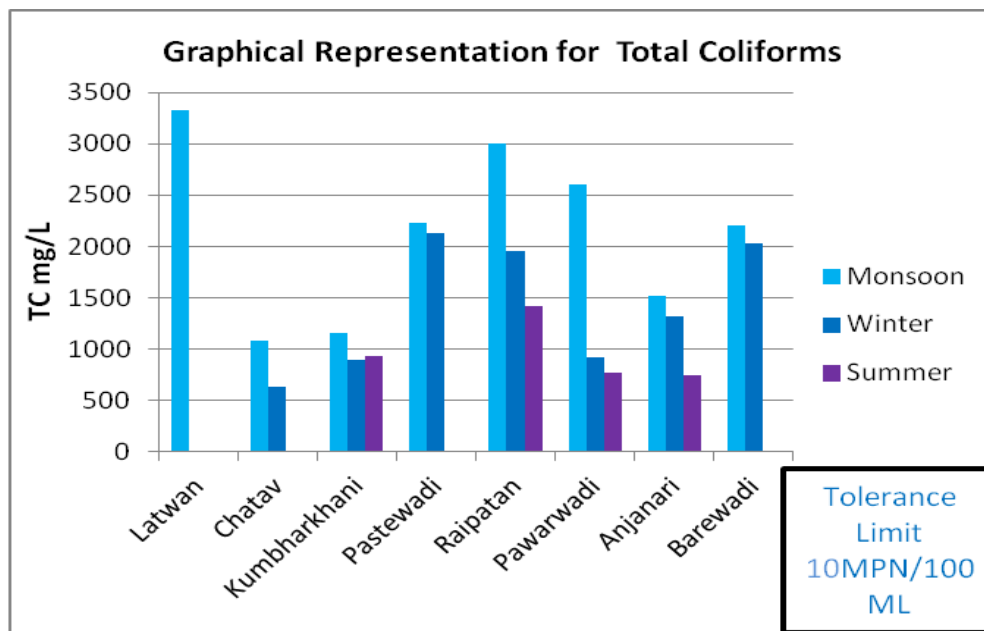
From the above graph it is observed that, Total coliform count of all station is high than tolerance limit during all seasons.

3) Satara District



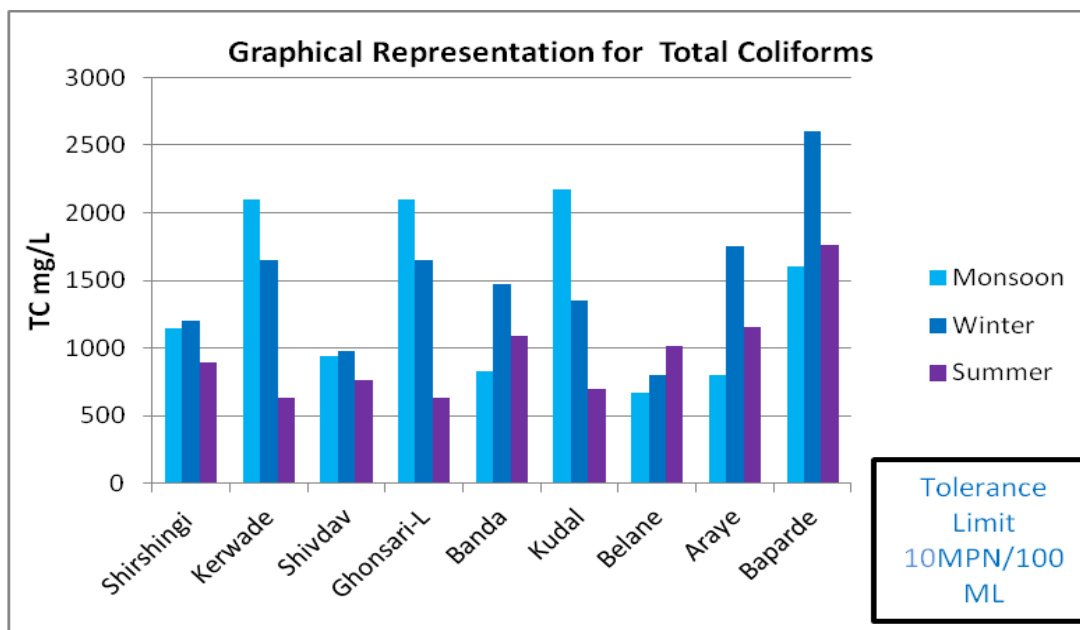
From the above graph it is observed that, Total coliform count of all station is high than tolerance limit during all seasons.

4) Ratnagiri District



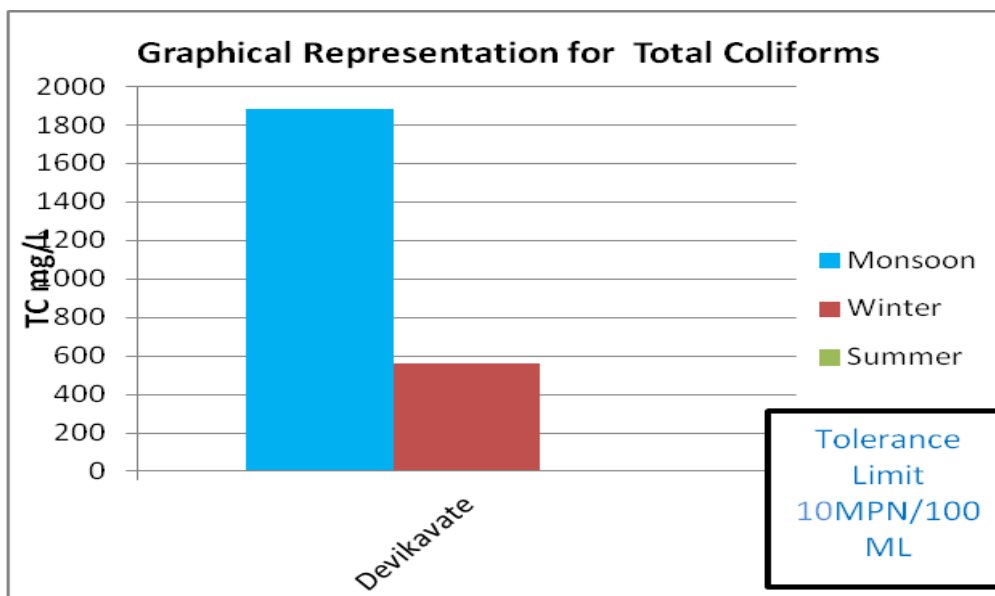
From the above graph it is observed that, Total coliform count of all station is high than tolerance limit during all seasons. But Latwan, Raipatan shows very high coliforms count during monsoon.

5) Sindhudurga District



From the above graph it is observed that, Total coliform count of all station is high than tolerance limit during all seasons.

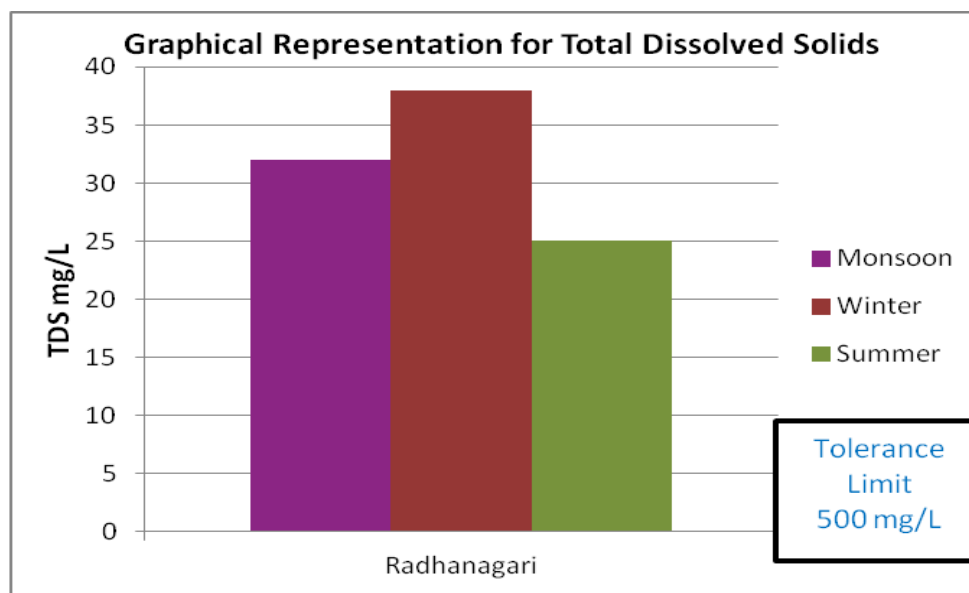
6) Solapur District



From the above graph it is observed that, Total coliform count Devikavathe station is high than tolerance limit during all seasons.

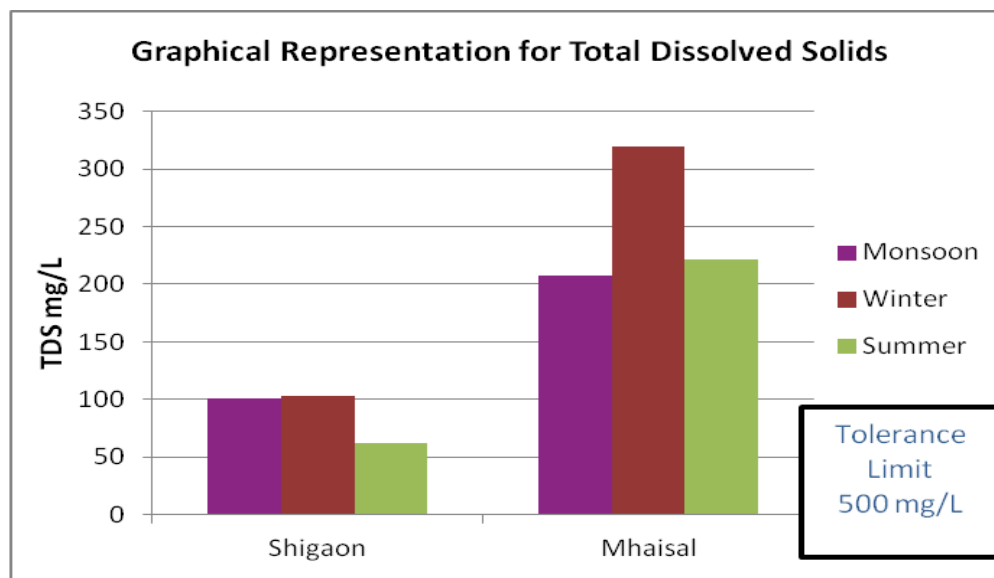
E) Total Dissolved Solids (TDS)

1) Kolhapur District



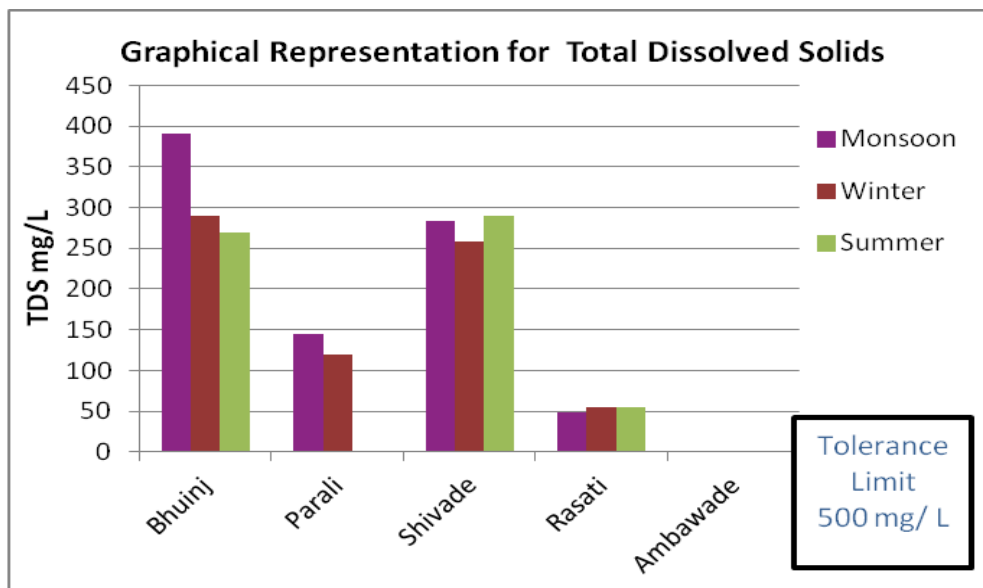
From the above graph it is observed that, TDS level of Radhanagari station is within desirable limit during all seasons.

2) Sangli District



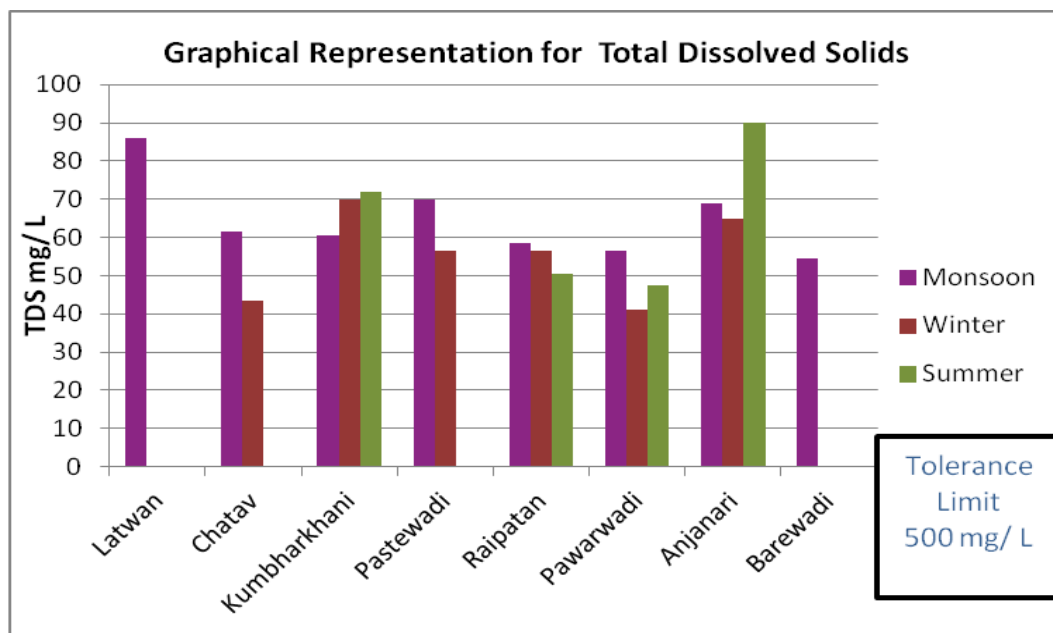
From the above graph it is observed that, TDS level of all the station is within desirable limit during all the seasons.

3) Satara District



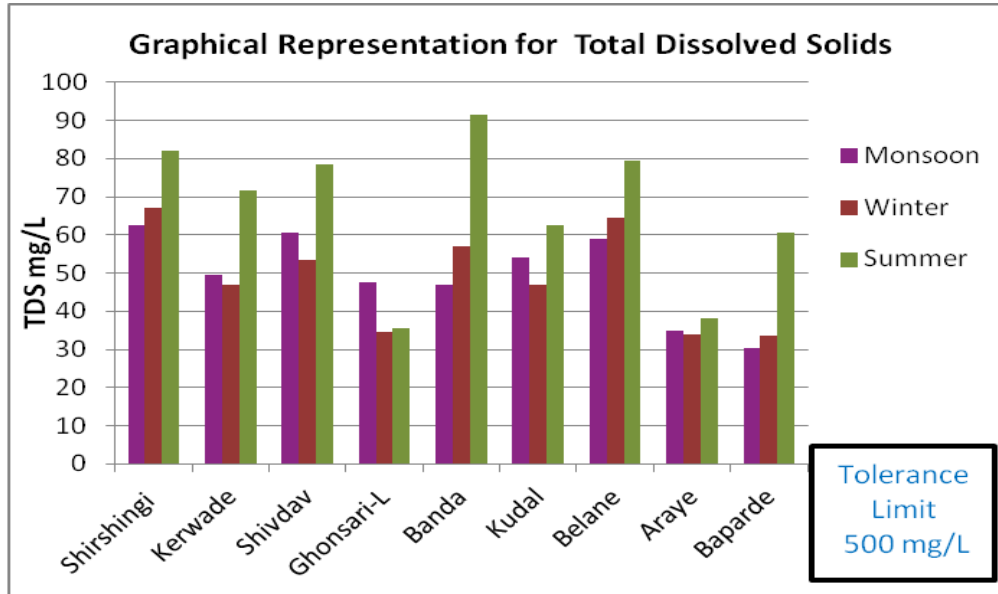
From the above graph it is observed that, TDS level of all the station is within desirable limit during all the seasons.

4) Ratnagiri District



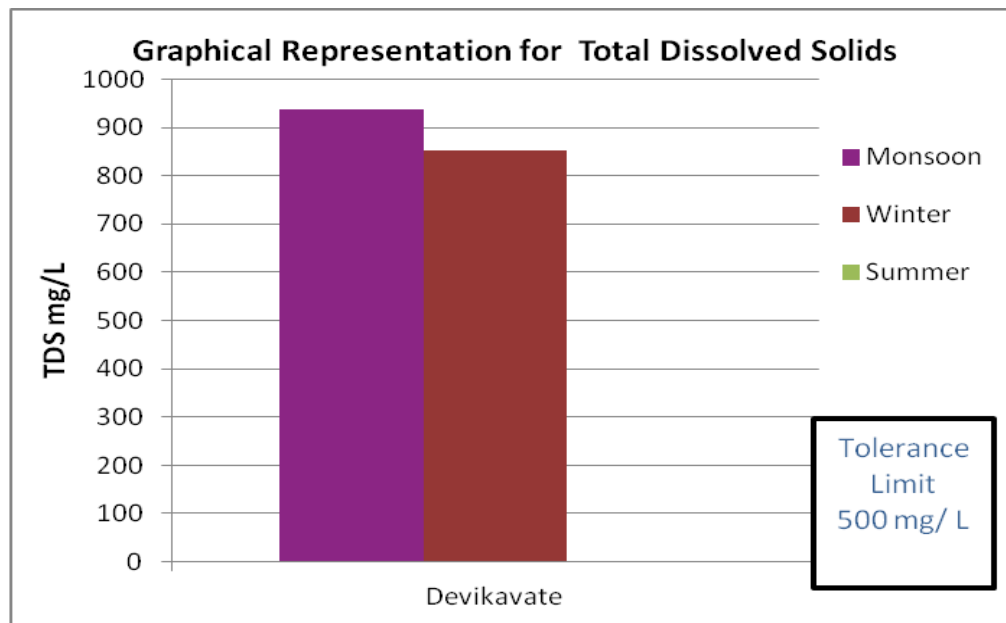
From the above graph it is observed that, TDS level of all the station is within desirable limit during all the seasons.

5) Sindhudurga District



From the above graph it is observed that, TDS level of all the station is within desirable limit during all the seasons.

6) Solapur District



From the above graph it is observed that, TDS level of Devikavathe station is within desirable limit during all the seasons.

CHAPTER – V

Conclusion

Chapter - 5

Conclusion.

CONCLUSION FOR 2011– 12

Many water quality parameters are used to reflect the impact of various impurities on selected water uses, as well as to quantify the extend of such impact of. Such water quality parameters may be either physical, chemical or biological.

From the previous chapter we concluded that, bacterial count of Ratnagiri district is very high than other stations during all season. This is an indicator of high organic pollution in the river body. Due to the human activity & release of industrial effluent in a river basins, it is very serious problem which dealing with this sites.

The Concentration of coliform bacteria of both faecal & non- faecal origin was found very high. This is a strong indicator of both urban pollution & discharge of city sewage in the water body.

Thus the water is not suitable for drinking purposes without any conventional treatment & disinfection.

REMEDIAL MEASURS

- For Industrial effluent & sewage water give treatment before discharge into river body.
- Use of such water for salt tolerance crop is recommended based on special study.
- Avoid human activities like cattle washing, bathing etc. in river basins.
- Awareness in local people about river water pollution.
- Classification of source may be as per use of water for irrigation based on Sodium Absorption Ratio, Percent Sodium, and Residual Sodium Carbonate.

CHAPTER – VI

Other Activities

Chapter - 6

Other Activities

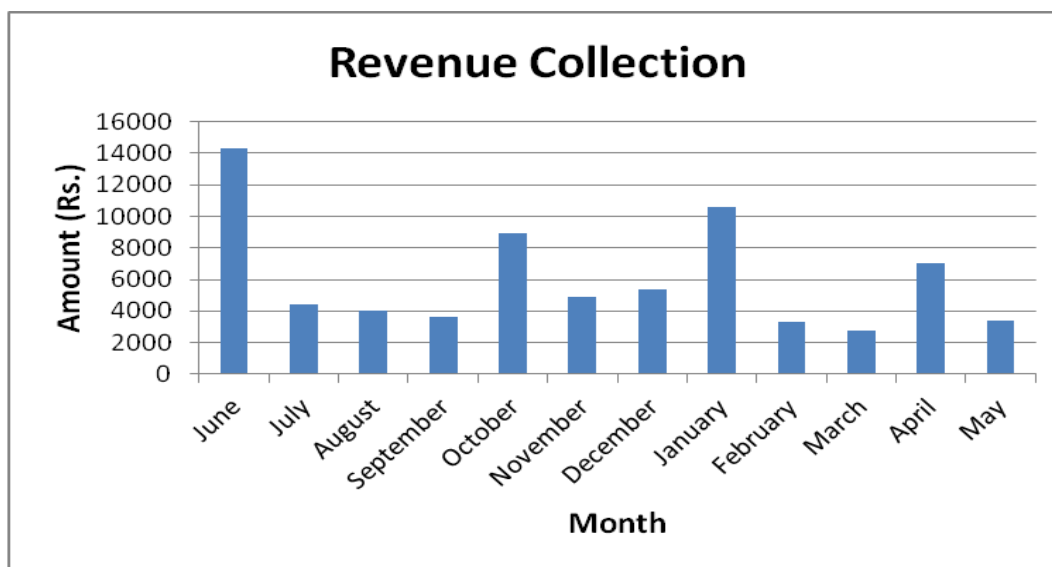
6.1 REVENUE GENERATION TO GOVERNMENT OF MAHARASHTRA

Apart from monitoring of water quality network for Water Quality lab level II at Kolhapur, the infrastructure facility is made available to the users from various Government, Non-Government, as well as individuals.

The revenue collected in this lab during the water year 2011-2012 is as follows.

Sr. No	Month	Amount
1.	June	14283/-
2.	July	4444/-
3.	August	3989/-
4.	September	3661/-
5.	October	8899/-
6.	November	4878/-
7.	December	5371/-
8.	January	10601/-
9.	February	3326/-
10.	March	2762/-
11.	April	7001
12.	May	3362/-
Total Amount		72,577/-

Graphical Representation for Revenue Collection



CHAPTER – VII

Annexure

List of Client 2011-2012

Sr. No.	Name of Client	Purpose
1.	Ichalkaranji Nagarparishad (STP)	Industrial Purpose
2.	Mr. Gourav R. Kadam, Kolhapur	Drinking Purpose
3.	Mr. Vijay R. Yewale, Kolhapur	Drinking Purpose
4.	Mr. Rajedra Kadam Kolhapur	Drinking Purpose
5.	Mr. Avinash Kambale, Kolhapur	Drinking Purpose
6.	Milk Corner, Kolhapur	Drinking Purpose
7.	Ichalkaranji Nagarparishad (STP)	Industrial Purpose
8.	Grisel- Green Commitment, Kolhapur	Industrial Purpose
9.	Mr. S. G. Sawant, Sangave.	Drinking Purpose
10.	Aadhar Nursing Home, Kolhapur	Drinking Purpose
11.	Ichalkaranji Nagarparishad (STP)	Industrial Purpose
12.	Ichalkaranji Industrial Co. Op. Estate Ltd.	Industrial Purpose
13.	Mr. Paruram T. Patil, Kolhapur	Drinking Purpose
14.	Ichalkaranji Nagarparishad (STP)	Industrial Purpose
15.	Mr. Santosh P. Nandyalkar	Drinking Purpose
16.	Babeshwar Metal Co. Shirol MIDC Kolhapur	Industrial Purpose
17.	Tilari Hydro. Project	Irrigation Purpose
18.	Mr. S. V. Satham	Industrial Purpose
19.	Mr. Yogesh Vatkar, Kolhapur	Study Purpose
20.	Mr. Ramesh N. Patil, Kolhapur	Industrial Purpose
21.	Miss. Supriya N. Gaikwad	Study Purpose
22.	Mr. Amey V. Kale	Industrial Purpose
23.	Mrs. Smita S. Gangadhar	Industrial Purpose
24.	Dudhganga Project	Drinking & Irrigation Purpose
25.	Mr. Ashokraov Mane Politechnique, Save	Drinking Purpose
26.	Menon Piston Rings Pvt. Ltd. Kolhapur	Industrial Purpose
27.	Mrs. Sarita D. Dalavi, Kolhapur	Drinking Purpose

28.	Mr. Kashinath B. Koli, Kolhapur	Drinking Purpose
29.	Mr. Shankar S. Bhaskar, Kolhapur	Drinking Purpose
30.	Mr. A. G. Pawar, Kolhapur	Drinking Purpose
31.	Mr. Badashaha A. Naikawade	Drinking Purpose
32.	Mr. Sushil K. Shinde, Kolhapur	Drinking Purpose
33.	Prof. C. H. Bhosale Kolhapur	Study Purpose
34.	Sarpanch Grampanchayat Mouje, Uchgaon	Drinking Purpose

Quality Policy

We at Water Quality Lab – Level II are committed to provide services for all interested parties as per their need & expectations to achieve total customer satisfaction.

This shall be achieved through continual improvement in all process and service quality with the help of implementation of QMS as per the ISO 9001 : 2008

(Er. A.S.Mehtre)
Executive Engineer
Hydrology Project Division,
Pune

Management ensures that the Quality Policy :

- a) Is appropriate to the purpose of the organization,
- b) Includes a commitment to comply with requirements and continually improve the effectiveness of the Quality Management System,
- c) Provides a framework for establishing and reviewing Quality Objectives,
- d) Is communicated through display and understood within the organization,
and
- e) Is reviewed in each MRM for continuing suitability.

ZERTIFIKAT ♦ CERTIFICATE ♦ CERTIFICADO ♦ CERTIFICAT



South Asia

CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited

certifies that

WATER QUALITY LAB.LEVEL-II
OPP. SHIVAJI UNIVERSITY,
NEAR RAJARAM TANK,
KOLHAPUR - 416 006, INDIA

has established
and applies a Quality Management System for

**Services for Water Testing &
River Water Monitoring for Water Quality**

*Further clarifications regarding the scope of this certificate and the applicability of
ISO 9001:2008 requirements may be obtained by consulting the certification body.*

An audit was performed, Report No. 20055703
Proof has been furnished that the requirements according to
ISO 9001 : 2008

are fulfilled. The certificate is valid until **2012-09-21**

Certificate Registration No. **99 100 11168**

Mumbai, 2009-09-22

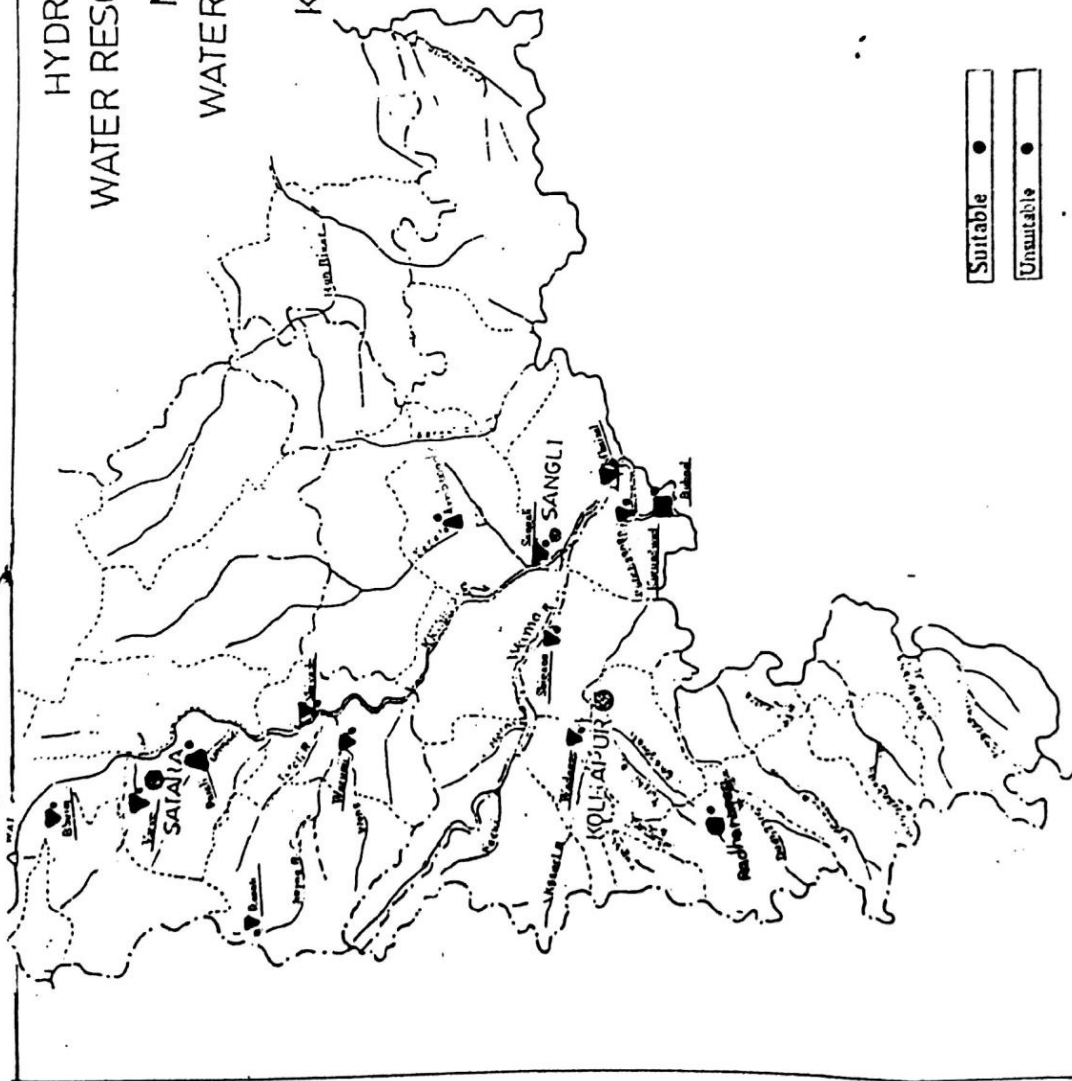


Certification Body
of TÜV SÜD South Asia Private Limited
Member of TÜV SÜD Group



TÜV SÜD South Asia • TÜV SÜD Group • Off Saki Vihar Road • Saki Naka • Andheri (East) • Mumbai - 400072 TÜV®

HYDROLOGY PROJECT WATER RESOURCES DIVISION PUNE 1. MAP SHOWING WATER QUALITY NET WORK, FOR KRISHNA BASIN



Sr No	W.Q. Station	River	Dist from origin Km.
1)	Bhunj	Krishna	35
2)	Shivade	Krishna	110
3)	Parli	Urmothi	
4)	Vare	Verna	
5)	Rasati	Koyana	
6)	Wanaji	Koyana	
7)	Slugaon	Warna	
8)	Wadange	Panchganga	200
9)	Sangali	Krishna	220
10)	Mhasal	Krishna	220
11)	Kurundwad	Krishna	
12)	Bubnal	Krishna	236

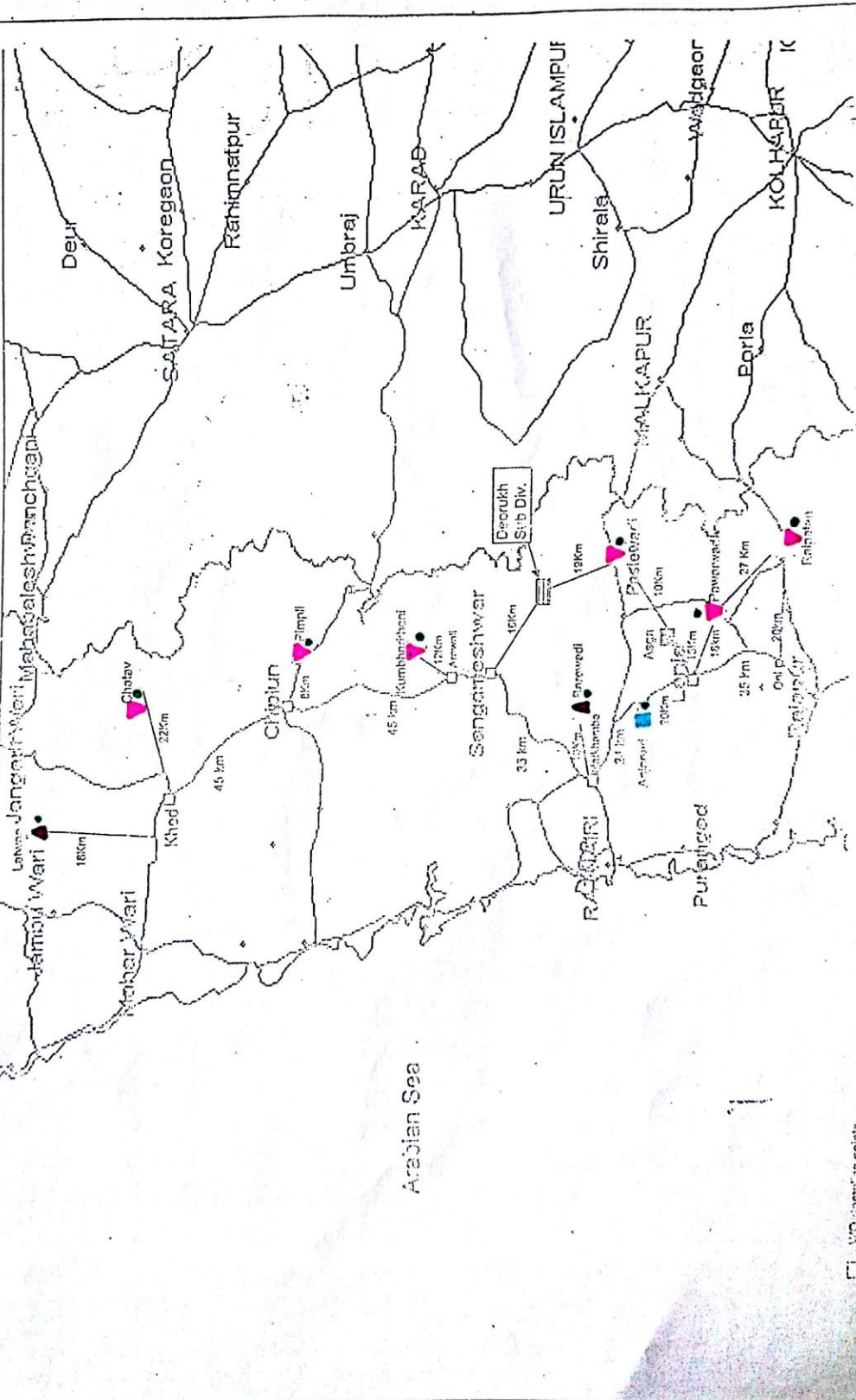
Surface Water Quality Net Work of
KRISHNA Basin in Maharashtra State

1) Baseline station
2) Trend station
3) Flux station
4) Reservoir

Suitable ●
Unsuitable ●

RATNAGIRI DISTRICT (KONKAN REGION)

Map of WQ Sampling locations under Deorukh Sub division (JPI Division Kalyan(Thane))



Route map of sampling locations under Phondaghat sub-division (IPI Dn Kalwa)

