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GOVERNMENT OF MAHARASHTRA
WATER RESOURCES DEPARTMENT

HYDROLOGY PROJECT (SW)

ANNUAL REPORT

WATER QUALITY LABORATORY LEVEL-II PUNE
YEAR 2011

SUPRINTENDING ENGINEER
DATA COLLECTION, PLANNING & HYDROLOGY CIRCLE, NASHIK

EXECUTIVE ENGINEER,
HYDROLOGY PROJECT DIVISION, PUNE-1

PREFACE

India is rich in water resources, being endowed with a network of rivers and blessed with snow cover in the Himalayan range that can meet a variety of water requirements of the country. However, with the rapid increase in the population of the country and the need to meet the increasing demands of irrigation, human and industrial consumption, the available water resources in many parts of the country are getting depleted and the water quality has deteriorated. Indian rivers are polluted due to the discharge of untreated sewage and industrial effluents.

There are thirteen major river basins (area more than 20,000 square kilometer) in the country, which occupy 82.4% of total drainage basins, contribute eighty five percent of total surface flow and eighty percent of the country's population. Major river basins are Brahmaputra, Ganga, Godavari, Krishna, Mahanadi, Narmada, Cauvery, and Tapi.

This report includes water quality data in Rivers Krishna, Bhima and its Tributaries for the period of June 2010 to May 2011 by the agency M/s. Mahabal Enviro Engineers Pvt. Ltd. as awarded a contract towards Operation and Maintenance of Water Quality Lab Level-II, Pune for the said period. The data has been interpreted to known the affected locations.

Therefore it is a great pleasure to handing over this precise report on analysis of water samples it WQ Laboratory Level – II at Pune which is under Hydrology Project Sub-Division, Pune.

This Annual 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. It is expected that this Report will provide an idea in brief about Water Quality Lab. Level -II at Pune. Our efforts can always be updated through valuable suggestions.

Sub-Divisional Engineer
Hydrology Project Sub-Division
Pune-06

Executive Engineer
Hydrology Project Division
Pune-01

Annual Report
On Water Quality Monitoring through Water Quality Lab Level-II, Pune for the Year 2010- 2011

I N D E X

Chapter I

EXECUTIVE SUMMARY

CHAPTER-1

EXECUTIVE SUMMERY

Annual Report
On Water Quality Monitoring through Water Quality Lab Level-II, Pune

1.1 Preamble:

Water is one of the most important and basic natural resources. Water is not only one of the most essential commodities of our day-to-day life, but the development of this natural resource also plays a crucial role in economic and social development processes. While the total amount of water available in the world is constant and is generally said to be adequate to meet all the demands of mankind, its quality and distribution over different regions of the world is uneven and causes problems of scarcity and suitability. It is therefore imperative that man develops, uses and manages this scarce commodity as rationally and efficiently as possible. In order to execute this task, accurate and adequate information must be available about the quality of this natural resource.

1.2 Water Quality Monitoring - Objectives

The Hydrology Project goals & main objectives of water quality monitoring in Krishna & WFR South of Tapi are -

1) Establish Trend stations quality
2) Observe the trend in water quality over a period of time
3) To create public awareness as regards water pollution & its prevention.
4) Surveillance over pollution through to water quality.

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, Pune 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, Data Collection, Planning & Hydrology Circle, Nashik.

1.3 Water Quality Monitoring - Scope

The Annual Report is prepared for the year 2010-11. 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 are considered.

TABLE SHOWING SAMPLES ANALYSED DURING THE REPORTING PERIOD

Sr. No.	Year	Trend Sample (First Round)	Trend Sample (Balance Round)	Dam Sample (First Round)	Dam Sample (Balance Round)	Total
1	2010-11	16	105	4	92	217
Total Samples analyzed during reporting period						**217**

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, HIS Manuals, and 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 Hydro metrological Data Processing Division, Nashik 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.

1.5 Result and Observation:

After observing all this data it is clear that most of the physical parameter are within tolerance limit except at few locations, like Dattwadi, Khamgaon, Pimple Gurav etc.

Most of the chemical parameters are also within tolerance limits, except following parameters.

i) DO ii) BOD iii)COD

Bacteriological parameter like Total Coliform is also exceeding the limits.

From the observations at Pimple Gurav, Dattwadi location, almost all parameters are crossing the desired limit which indicates that at the upstream of this location there are a considerable source of pollution.

1.6 Conclusion

Observing all the factors it can be concluded that, analysis result from some locations have shown increase in value of Biological Oxygen Demand, Total Coliform. The value of Biological Oxygen Demand is very high, even exceeding beyond desired limit is due to the presence of organic matter, which also reduces oxygen content in the water. Water having excess Biological Oxygen Demand is not fit for human activities or consumption.

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

It is observed with reference to Wilcox diagram generated through SWDES software for the data of said period; mostly all of the locations belong to Class C_3 & S_1. This indicates that the water flowing along these locations is mostly suitable for irrigation purpose for salt tolerant plant. For drinking purpose, it should be treated before use.

But with respect to parameters, locations like Dattwadi, Khamgaon, and Pimple Gurav are critical for certain parameters like Dissolved Oxygen, Biological Oxygen Demand, Chemical Oxygen Demand and Coliforms. In the point of

consideration for above location water is not suitable for irrigation & Drinking purpose.

1.7 Recommendations/Remedial Measures:

Water is one of our most important resources and although people act like there's an endless supply of it, the truth is that clean water is becoming scarce because of water pollution and over consumption. You can prevent water pollution of nearby rivers and lakes as well as groundwater and drinking water by following some simple guidelines in your everyday life.

- Be careful about what you throw down your sink or toilet. Don't throw paints, oils or other forms of litter down the drain.
- Leakages from drainage pipe lines must be avoided. If this enters fresh water it causes water pollution. So leakages must be avoided by repairing immediately.
- Use less water. this might sound simplistic, but decreasing your water consumption is one of the keys to minimizing water pollution. By reducing the amount of water you use, you will reduce the amount of water that flows into sewage treatment systems.

1.8 Suggestions:

- Bring awareness among people. So people must be against of dumping wastes and sewage in to fresh water. They must force the government to go for an alternate way like treating the sewage before dumping. And people who dump wastes must be penalized. It is the public awareness that brings a change.
- Water quality Annual Report shall be publicly published every year.
- Take care of the Earth and she will take care of you

Chapter II
INTRODUCTION

CHAPTER-2

INTRODUCTION

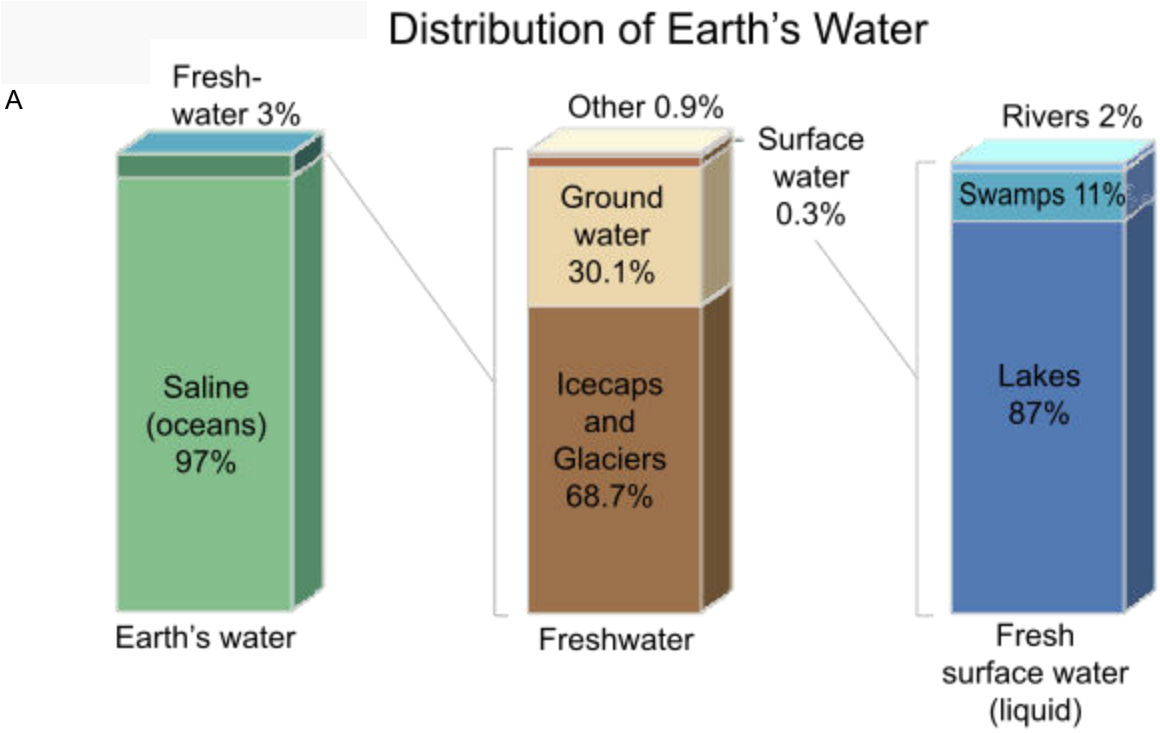
2.1 General:

Maharashtra is the third largest state in India in area & population. The state of Maharashtra has major rivers such as Krishna, Bhima Godavari, Tapi, Purna & Vardha Vainganga River. Major cities have developed along the river banks & due to increase in industrialization & urbanization; these natural resources have been deteriorated. Water resources are sources of water that are useful or potentially useful. Uses of water include agricultural, industrial, household, recreational and environmental activities.
Virtually all of these human uses require fresh water. 97% of the water on the Earth is salt water, and only 3% is fresh water of which slightly over two thirds is frozen in glaciers and polar ice caps. The remaining unfrozen fresh water is mainly found as groundwater, with only a small fraction present above ground or in the air. Fresh water is a renewable resource, yet the world's supply of clean, fresh water is steadily decreasing. Water demand already exceeds supply in many parts of the world and as the world population continues to rise, so too does the water demand. Awareness of the global importance of preserving water for ecosystem services has only recently emerged as, during the 20th century, more than half the world's wetlands have been lost along with their valuable environmental services. Biodiversity-rich freshwater ecosystems are currently declining faster than marine or land ecosystems. The framework for allocating water resources to water users (where such a framework exists) is known as water rights.

It is estimated that 69% of worldwide water use is for irrigation, with 15-35% of irrigation withdrawals being unsustainable. It takes around 3,000 Liters of water, converted from liquid to vapour, to produce enough food to satisfy one person's daily dietary need. This is a considerable amount, when compared to that required for drinking, which is between two and five Liters. To produce food for the 6.5 billion or so people who inhabit the planet today require the water that

would fill a canal ten metres deep, 100 metres wide and 7.1 million kilometres long – that's enough to circle the globe 180 times.

A



A graphical distribution of the locations of water on Earth

2.2 Water Quality Network Layout

Water Quality of Rivers Krishna, Bhima & WFR South of Tapi, and its Tributaries in being monitored by Central Water Commission, Water Resources Division of Maharashtra & Andhra Pradesh and the Central Pollution Control Board through the respective State Pollution Control Boards.

The water quality monitoring of River Bhima and its tributaries and River WFR South of Tapi and its tributaries flowing through Western Maharashtra is being carried out by Hydrology Project Division Pune under Hydrology Project.

In Bhima Basin Water Quality is monitored by Hydrology Project Division Pune at 18 stations on various rivers flowing through Western Maharashtra. Also the water quality of 4 reservoirs, which are used as a source of drinking water, is also being monitored by this division. The stations are classified as baseline, trend and flux stations based on the frequency of sampling and location of stations. Details of Basin and Sub basins in the region are given in Table 1.

Out of 22 Water Quality stations on tributaries of Bhima, 17 are trend stations, 1 is flux station and 4 are of Dam Location. Annexure VII shows Network of Water Quality Monitoring stations of various types in the jurisdiction of water quality lab level-II under Hydrology Project Division, Pune.

2.2 Water Quality Monitoring - Objectives

The Hydrology Project goals & main objectives of water quality monitoring in Krishna Basin are -

1) Establish Trend stations quality
2) Observe the trend in water quality over a period of time
3) To create public awareness as regards water pollution & its prevention.
4) Surveillance over pollution through to water quality.

Observations of analysis of physical & chemical parameters as per "Uniform Protocol for Water Quality Monitoring 2001" for each location followed by Operation and Maintenance of Water Quality Laboratory Level-II, Pune 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, Data Collection, Planning & Hydrology Circle, Nashik.

2.3 Water Quality Monitoring - Scope

The Annual Report is prepared for the year 2010-11. 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 2010-11 are considered.

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

Sr. No.	Year	Trend Sample (First Round)	Trend Sample (Balance Round)	Dam Sample (First Round)	Dam Sample (Balance Round)	Total
1	2010-11	16	105	4	92	217
Total Samples analyzed during reporting period						**217**

2.4 Other activities

During the year 2010-11 many clients approached to the laboratory. The valuable clients availed the facility of the laboratory are as below;

1) Lonavala Municipal Corporation
2) Central Water Commission
3) Rakesh Enterprise, Yerwada, Pune
4) Nira Devghar project, Bhatghar, Pune
5) Technogreen Environmental Solutions

REVENUE GENERATED DURING THE REPORTING PERIOD

Sr. No.	Year	Amount Received
1.	2010-2011	13,16,125

2.5 Extended Scope of Laboratory

Under Hydrology Project(SW) Maharashtra Water Quality Monitoring is being carried out with prescribe W.Q. Network with 6 Level-II & 38 Level-I Labs followed by 163 sampling locations spread all over the State. First Surveillance audit of ISO 9001:2008 was successfully completed in January 2011.

AQC Exercise organized by CPCB – This lab participated in 26th AQC Exercise organized by CPCB during the reported period and Water Quality Lab Level II secured 90.9 % score and will also participate in 27th forthcoming exercise for up gradation and finding of errors.

AQC Exercise organized by Circle Office – WQ Lab level II Pune was host for the AQC exercise 2011 organized by Circle office. Final result was declared by Circle office. We secured 93 % score.

Visits: Many visitors from various sectors visited the lab and appreciated the efforts taken by this lab.

The infrastructure facility is also made available to all institutional organization for visit and study purposes and the generated data of Water Quality is also made available to the users who are a member of Hydrology Project.

SALIENT FEATURES OF LABORATORY:

Latitude	:	N-18^0 33' 30"
Longitude	:	E- 73^0 53' 42"
River Basins	:	1. Ghod 2. Pavana 3. Indrayani 4. Mutha 5. Nira 6. Ambi 7. Sina 8. Mula 9. Bhima 10. Mula-Mutha
Year of Establishment	:	September 1999
No. of Flux Sample locations	:	1 Nos.
No. of Baseline Sample locations	:	0 Nos.
No. of Trend Sample Locations	:	17 Nos.
No. of Reservoir Locations	:	4 Nos.
No. of Parameters Analysed	:	31 Nos.
Staff Position	:	Work of Operation & Maintenance of Lab. on annual contract basis.
Government staff related to the laboratory	:	1. Shri. M.R. Metkari Executive Engineer 2. Shri. A.D. Gumaste Sub Divisional Engineer 3. Mrs. S.K. Kasar Govt. Analyst
Lab. Operating Agency	:	M/S Mahabal Enviro Engg Pvt. Ltd.
staff working in the laboratory	:	1. Manisha Dharam Key person 2. Mayuri Waghmare Chief Chemist 3. Vaibhavi Shete Microbiologist 4. Rupali Chandrekar. Senior Research Chemist 5. Amol Sangulage Field Chemist 6. Sheetal Kale Microbiologist 7. Sandhya Gade Chemist 8. Gautam Dhone Lab Attendant

DATA COLLECTION, PLANNING & HYDROLOGY CIRCLE, NASHIK

WATER QUALITY LAB, LEVEL – II PUNE

ORGANISATION CHART

SUPRINTENDING ENGINEER,
DATA COLLECTION, PLANNING & HYDROLOGY CIRCLE, NASHIK

EXECUTIVE ENGINEER,
HYDROLOGY PROJECT DIVISION, PUNE

SUB-DIVISIONAL ENGINEER,
HYDROLOGY PROJECT SUBDIVISION. PUNE / MR

GOVT. ANALYST / ASST.MR

OPERATING AGENCY

CHIEF CHEMIST

ASSISTANT CHEMIST

List of sampling locations under Jurisdiction of Water Quality Lab level-II @ Pune 2010-2011

Sr. No.	NAME OF STATION	DISTRICT	TAHASIL	NAME OF RIVER
Trend Station				
1	Ambegaon	Pune	Junner	Ghod
2.	Ambeghar	Pune	Bhor	Nira
3.	Bandalgi	Solapur	S. Solapur	Sina
4.	Barur (Takali)	Solapur	S. Solapur	Bhima
5.	Chaskaman	Pune	Rajgurunagar	Bhima
6.	Dattawadi	Pune	Haveli	Mutha
7.	Daund	Pune	Daund	Bhima
8.	Kale-colony	Pune	Maval	Pavana
9	Kasti	A'Nagar	Shrigonda	Ghod
10	Khamgaon	Pune	Daund	Mula-Mutha
11	Narsinhpur	Pune	Indapur	Bhima
12	Nighoje	Pune	Rajgurunagar	Indrayani
13	Nimgaon-Gangurde	A'Nagar	Karjat	Sina
14	Paud	Pune	Mulshi	Mula
15	Pimple-gurav	Pune	Haveli	Pavana
16	Rakshewadi	Pune	Shirur	Bhima
17	Sarati	Solapur	Malshirus	Nira
Flux Station				
18	Devikavathe	Solapur	Akkalkot	Bhima
Reservoirs				
19	Khadakwasla Dam	Pune	Haveli	Mutha
20	Panshet Dam	Pune	Maval	Ambi
21	Pavana Dam	Pune	Maval	Pavana
22	Ujjani Dam	Pune	Indapur	Bhima

Chapter III
METHODOLOGY

CHAPTER-3

METHODOLOGY

3.1 General:

This laboratory covers Surface Water component which covers Rivers and Reservoir Locations in Krishna, Bhima & WFR South of Tapi

3.2 Rivers

The major rivers of Maharashtra are Godavari, Krishna, Bhima, Tapi-Purna,Wardha and Wainganga. The rivers can be broadly divided into two categories – the east – flowing that drain into the Bay of Bengal, and the west – flowing into the Arabian Sea. The Former cover a greater part of Maharashtra state (about 75 %).

3.3 Water Quality Monitoring - Objectives

Observations of analysis of physical & chemical parameters as per "Uniform Protocol for Water Quality Monitoring 2001" for each location followed by Operation and Maintenance of Water Quality Laboratory Level-II, Pune 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, Data Collection, Planning and Hydrology Circle, Nashik.

3.4 Methodology:

Analysis of Physical and Chemical parameters is done in the laboratory on the basis of Standard Analytical Methods, Instrument Operating Instructions, HIS Manuals and 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 Table below shows the number of sample analyzed during the year 2010-11. In order to study water quality status station wise, all locations covered under this lab during the year 2010-2011 are considered.

TABLE SHOWING SAMPLES ANALYSED DURING THE REPORTING PERIOD

Sr. No.	Year	Trend Sample (First Round)	Trend Sample (Balance Round)	Dam Sample (First Round)	Dam Sample (Balance Round)	Total
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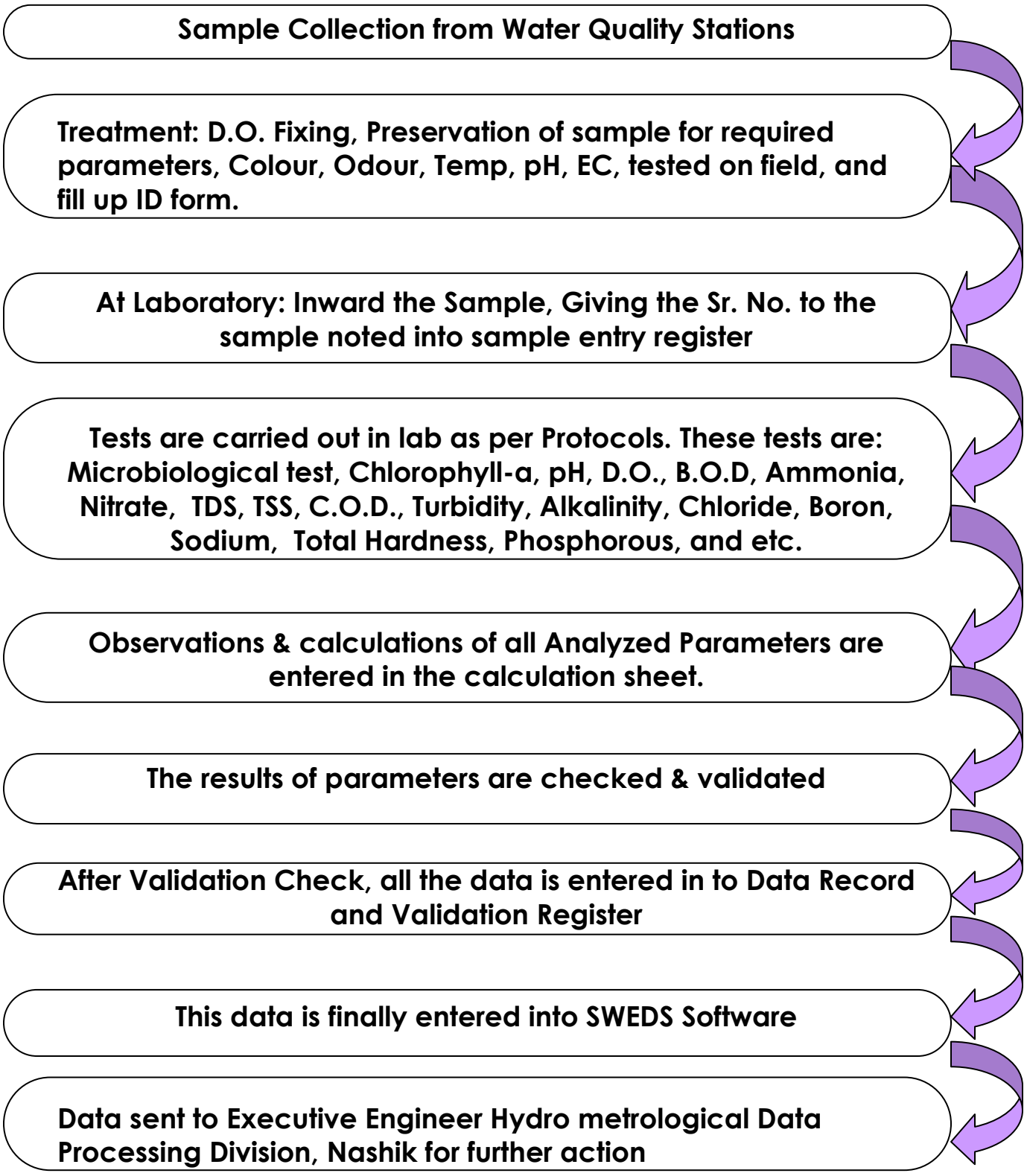
Total Samples analyzed during reporting period						**217**

3.5 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 performs as per guidelines of world bank with HIS manuals and APHA ,21st Ed, 2005 as a standard procedures for analysis of samples.

As well refers HP Manuals for analysis of various samples received from users for various purposed like Domestic use, Drinking, Irrigation etc.

FLOW CHART OF ANALYSIS OF HP WATER SAMPLE



Methodology For the analysis of Water Quality samples the following parameters were analyzed during the Period 2010 – 2011.

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

Sr. No	Parameters	Methodology
1.	Colour	APHA, 21st Ed., 2005, 2120-B, 2-2
2.	Odour	HP WQ Analysis Operating Manual,4-64
3.	Temperature	APHA, 21st Ed., 2005, 2550-B, 2-61
4.	pH	APHA, 21st Ed., 2005, 4500-H^+- B, 4-90
5.	Electric Conductivity	APHA, 21st Ed., 2005, 2510- B, 2-47
6.	Dissolved Oxygen	APHA, 21st Ed., 2005, 4500-O C,4-138
7.	Turbidity	APHA, 21st Ed., 2005, 2130-B, 2-9
8.	Total Solids	APHA, 21st Ed., 2005, 2540 B,2-56
9.	Dissolved Solids	APHA, 21st Ed., 2005, 2540 C,2-57
10.	Suspended Solids	APHA, 21st Ed., 2005, 2540 D,2-58
11.	NH_3-N	APHA, 21st Ed., 2005, 4500-NH_3 F, 4-110
12.	NO_2^-	APHA, 21st Ed., 2005, 4500-NO_2-B, 4-118
13.	NO_3^-	APHA,21st Ed., 2005, 4500-NO_3, B -4 -120
14.	Total Phosphorous	APHA, 21st Ed., 2005, 4500 P, E, 4-153
15.	Biochemical Oxygen Demand	HP WQ Analysis Operating Manual,4-10

16.	Chemical Oxygen Demand	APHA, 21st Ed., 2005, 5220-B, 5-15
17.	Potassium K^+	APHA, 21st Ed., 2005, 3500- K, 3-88
18.	Sodium Na^+	APHA, 21st Ed., 2005, 3500- Na, 3-98
19.	Calcium Ca^{++}	APHA, 21st Ed., 2005, 3500-B, 3-65
20.	Magnesium Mg^{++}	APHA, 21st Ed., 2005, 3500-Mg, B, 3-84
21.	Total Hardness	APHA, 21st Ed., 2005, 3111-B, 3-17
22.	Carbonate CO_3	APHA, 21st Ed., 2005, 2320-B, 2-27, 5 -1 & 4500-CO_2-D, 4-34
23.	Bi-Carbonate H CO_3	APHA, 21st Ed., 2005, 2320-B, 2-27, 5 -3 & 4500-CO_2-D, 4-34
24.	Chloride Cl	APHA, 21st Ed., 2005, 4500-Cl, B, 4-70
25.	Fluoride F	APHA, 21st Ed., 2005, 4500-F^-, D, 4-85
26.	Boron B	APHA, 21st Ed., 2005, 4500-B-C, 4-23
27.	Total Coliforms	APHA, 21st Ed., 2005, 9221-B, 9-49
28.	Faecal Coliforms	APHA, 21st Ed., 2005, 9221-E, 9-56
29.	Alkalinity	APHA, 21st Ed., 2005, 2320, 2-27
30.	Total Kjeldahl Nitrogen	APHA, 21st Ed., 2005, 4500 N Org B,4-131
31.	Chlorophyll	APHA, 21st Ed., 2005, 10200 H,10-18

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Sr. No.	Year	Trend Sample (First Round)	Trend Sample (Balance Round)	Dam Sample (First Round)	Dam Sample (Balance Round)	Total
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Total Samples analyzed during reporting period						**217**

Chapter IV
RESULT & OBSERVATIONS

CHAPTER - 4

RESULTS AND OBSERVATIONS

4.1 General

For drawing up and implementing any water quality management plan, water quality monitoring is essential in identification of water bodies or their part(s) in need of restoration and also nature and magnitude of pollution control required. It also helps in prioritization of pollution control efforts and evaluating trends and effectiveness of such efforts.

In the present data yearbook, the assessment of physicochemical and bacteriological water quality of various rivers for different seasons shows a varying level of pollution in the water bodies. The water quality of various river monitored does not maintain the sanctity and are polluted to varying extent. The increasing urbanization and industrialization in the area is affecting the quality of the water to a great extent. The physicochemical as well as bacteriological water quality of these riverine systems is not satisfactory and this can further deteriorate in the nearby future.

The presence of coliform bacteria in higher concentration in water especially during rainy season indicates the lack of sanitation facilities in the region. The BOD and COD loading in the water body is an evidence of the anthropogenic activities in the catchments of the rivers, which is adversely influencing the water quality. The habit of open defecation is a common site on the bank of rivers that consequently floods into the river causing deterioration of the quality of the water. The increased human activities can cause to an increase in pollution load to the river system. This in turn may lead to the further deterioration of the quality of water.

The human influence, apart from affecting the water quality, can accelerate eutrophication of the reservoirs which would be cultural or artificial eutrophication rather than the natural. Following the current trend, the reservoir may go to the entropic status in nearby future.

The water quality monitoring in the area of surface water is performed in order to determine the quality of water. Various parameters are analyzed in the laboratory and 6 parameters are tested at field level. All these tasks are recorded are utilized for preparing the Annual Report by performing some specific exercise. These data are considered in order to specify the quality of water at each location. This also helps to determine the pollution level or concentration in each source of water at each station.

4.2 Water Quality status- Stations wise Exercise

In order to study water quality status station wise, all locations covered under this lab during the year 2010-2011 are considered. Seasonal averages of all analyzed parameters are calculated for study of seasonal water quality trend at each location.

4.3 Objectives:

Observations of all physical & chemical parameters analyzed for each location individually & interpretation of data to identify seasonal trend. Also critical parameters are identified at every location, including finding out causes behind it at every location and every parameter.

4.4 Critical parameters Identified:

After observing all this data it is clear that most of the physical parameter are within tolerance limit except at few locations, like Pimple Gurav, Dattwadi, Khamgaon, etc.

At some stations most of the chemical parameters are also within tolerance limits, except following parameters.

i) DO ii) BOD iii)COD

Bacteriological parameter like Total Coliform is also exceeding the limits.

Classification of location on the basis of Wilcox technique for the use of water for irrigation purpose

I. Trend Stations

Sr. No.	Name of Location	Year	Class as per Wilcox technique	Recommendation
Bhima River				
1	Barur (Takali)	2010-2011	S1 & C3	Water can be use for salt tolerant plant
2	Daund	2010-2011	S1 & C3	Water can be use for salt tolerant plant
3	Devikavathe	2010-2011	S1 & C3	Water can be use for salt tolerant plant
4	Narsinhpur	2010-2011	S1 & C3	Water can be use for salt tolerant plant
5	Rakshewadi	2010-2011	S1 & C3	Water can be use for salt tolerant plant
6	Chaskaman	2010-2011	S1 & C2	Water is suitable for Irrigation purpose.
Nira River				
1	Ambeghar	2010-2011	S1 & C1	Water is suitable for Irrigation purpose with most crops with most soil
2	Sarati	2010-2011	S1 & C3	Water can be use for salt tolerant plant
Ghod River				
1	Ambegaon	2010-2011	S1 & C2	Water is suitable for Irrigation purpose.
Sina River				
1	Bandalgi	2010-2011	S1 & C3	Water can be use for salt tolerant plant
2	Nimgaon	2010-2011	S1 & C3	Water can be use for salt tolerant plant
Mula- Mutha River				
1	Khamgaon	2010-2011	S1 & C3	Water can be use for salt tolerant plant
Mutha River				
1	Dattwadi	2010-2011	S1 & C2	Water is suitable for Irrigation purpose.
Pavana River				
1	Kale colony	2010-2011	S1 & C1	Water is suitable for Irrigation purpose with most crops with most soil
2	Pimple Gurav	2010-2011	S1 & C2	Water is suitable for Irrigation purpose.
Indrayani River				
1	Nighoje	2010-2011	S1 & C1	Water is suitable for Irrigation purpose with most crops with most soil
Mula River				
1	Paud	2010-2011	S1 & C1	Water is suitable for Irrigation purpose with most crops with most soil

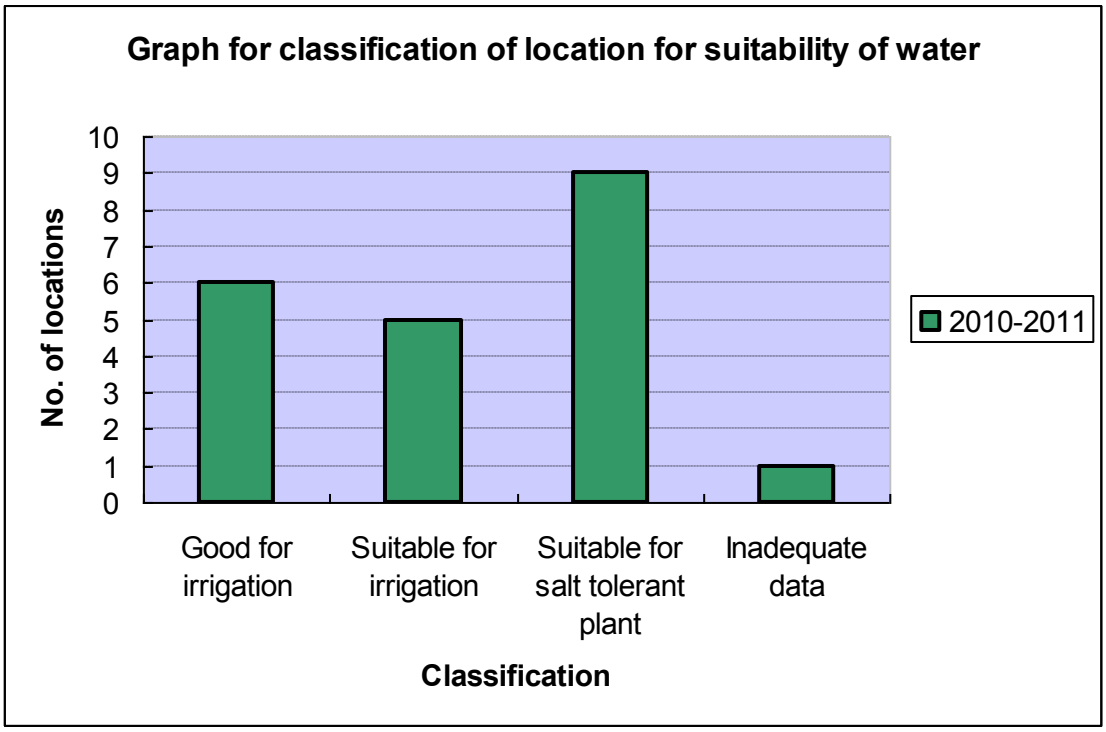
II. Dam Locations

1	Khadkwasala	2010-2011	S1 & C1	Water is suitable for Irrigation purpose with most crops with most soil
2	Panshet	2010-2011	S1	Unable to classify because of inadequate data
3	Pavana	2010-2011	S1 & C1	Water is suitable for Irrigation purpose with most crops with most soil
4	Ujjani	2010-2011	S1 & C2	Water is suitable for Irrigation purpose.

Sr. No.	River	Year	Observations
1	Bhima	2010-2011	Along Bhima River there are 6 Locations and as per above (ref. table) classification it shows that out of 6 locations 5 locations such as Barur, Daund, Nashinpur,, Devikavthe these water is able to used for salt tolerant plant. Remaining 1 location Chaskaman water is suitable for irrigation purpose without any treatment.
2	Nira	2010-2011	Along Nira River there are 2 Locations and as per above (ref. Table) classification it shows that 1 location i.e. Sarati water is suitable for salt tolerant plant. Remaining 1 location i.e. Ambeghar water is suitable for Irrigation purpose with most crops with most soil
3	Ghod	2010-2011	Along Ghod River there are 2 Locations and as per above (ref. table) classification it shows that 1 location i.e. Ambegaon, water is suitable for Irrigation purpose with most crops with most soil. Remaining 1 location i.e. Kashti unable to classify under Wilcox technique because of inadequate data
4	Sina	2010-2011	Along Sina River there are 2 Locations and as per above (ref. Table) classification it shows that 2 location i.e. Bandalgi & Nimgaon Gangurde water is suitable for salt tolerant plant.
5	Mula-Mutha	2010-2011	Along Mula-Mutha River there is 1 Location and as per above (ref. table) it shows that 1 location i.e. Khamgaon water is suitable for salt tolerant plant.
6	Mutha	2010-2011	Along Mutha River there is1 Location and as per above (ref. table) classification it shows that this location Dattwadi water is able to used for irrigation purpose without any treatment.
7	Pavana	2010-2011	Along Pavana River there are 2 Location and as per above (ref. table) classification it shows that 1 location i.e. Kale Colony water is suitable for Irrigation purpose with most crops with most soil. Remaining 1 location i.e. Pimple Gurav water is able to used for irrigation purpose without any treatment.
8	Indrayani	2010-2011	Along Indrayani River there is1 Location and as per above (ref. table) classification it shows that this location Nighoje water is suitable for Irrigation purpose with most crops with most soil
9	Mula	2010-2011	Along Mula River there is1 Location and as per above (ref. table) classification it shows that this location Paud water is suitable for Irrigation purpose with most crops with most soil.
10	Dam Locations	2010-2011	4 locations goes under dam and as per above (ref table) classification it shows that out of 4 locations 1 location Ujjani water is suitable for irrigation purpose. Remaining 2 locations Khadakwasla, Pavana water is suitable for Irrigation purpose with most crops with most soil and 1 locations Panshet dam unable to classify because of inadequate data.

Abstract for classification of water for Irrigation purpose

Sr. No.	Year	Good for irrigation	Suitable for irrigation	Suitable for salt tolerant plant	Inadequate data	Total
1.	2010-2011	6	5	9	1	21



DATA ABSTRACT FOR PUNE SUB-DIVISION FOR 2010-11										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
Station: Ambeghar										
DO	mg/L	7.1	6.8	7.0	7.2	6.4	6.8	7.1	6.4	6.8
BOD	mg/L	2.0	1.4	1.7	2.8	1.8	2.3	3.2	2.6	2.9
COD	mg/L	13.6	10.4	12.0	14.4	12.0	13.2	14.4	12.8	13.6
Total coliforms	MPN/100 mL	9200	3500	6350	16000	5400	10700	11000	5400	8200
Station: Dattwadi										
DO	mg/L	6.6	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0
BOD	mg/L	28.0	22.0	25.0	38.0	24.0	31.0	50.0	44.0	47.0
COD	mg/L	58.0	46.0	52.0	80.0	44.0	62.0	124.0	110.0	117.0
Total coliforms	MPN/100 mL	160000	160000	160000	160000	160000	160000	350000	170000	260000
Station: Kale Colony										
DO	mg/L	7.4	6.8	7.1	7.2	6.6	6.9	7.2	7.1	7.2
BOD	mg/L	1.6	1.4	1.5	1.8	1.4	1.6	2.0	1.6	1.8
COD	mg/L	10.4	9.6	10.0	13.6	11.2	12.4	13.6	10.4	12.0
Total coliforms	MPN/100 mL	2800	1700	2250	3500	2200	2850	7000	3300	5150
Station: Nighoje										
DO	mg/L	6.8	6.4	6.6	7.0	6.8	6.9	7.6	6.4	7.0
BOD	mg/L	2.2	1.8	2.0	2.4	2.0	2.2	3.0	2.0	2.5
COD	mg/L	12.0	10.4	11.2	15.2	11.2	13.2	15.2	10.4	12.8
Total coliforms	MPN/100 mL	16000	9200	12600	16000	2200	9100	280000	170000	225000

DATA ABSTRACT FOR PUNE SUB-DIVISION FOR 2010-11										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
Station: Khadakwasla										
DO	mg/L	7.6	6.6	7.1	7.3	6.8	7.1	7.4	6.8	7.1
BOD	mg/L	1.3	1.0	1.2	1.3	1.2	1.3	1.4	1.2	1.3
COD	mg/L	9.6	8.8	9.2	9.6	8.8	9.2	10.4	8.0	9.2
Total coliforms	MPN/100 mL	9200	5400	7300	9200	3500	6350	5400	2400	3900
Station: Panshet										
DO	mg/L	7.6	7.0	7.3	7.2	6.8	7.0	7.3	6.6	7.0
BOD	mg/L	1.4	1.0	1.2	1.2	1.0	1.1	1.3	1.0	1.2
COD	mg/L	9.6	8.0	8.8	9.6	8.0	8.8	9.6	8.8	9.2
Total coliforms	MPN/100 mL	9200	3500	6350	5400	2400	3900	5400	200	2800
Station: Pavana										
DO	mg/L	7.6	6.8	7.2	7.2	7.0	7.1	8.3	6.4	7.4
BOD	mg/L	1.3	1.0	1.2	1.4	1.1	1.3	1.4	1.3	1.4
COD	mg/L	8.8	8.0	8.4	10.4	9.6	10.0	9.6	8.8	9.2
Total coliforms	MPN/100 mL	5400	1100	3250	3500	1100	2300	7000	2300	4650

DATA ABSTRACT FOR SHIRUR SUBDIVISION FOR 2010-11										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
Station: Ambegaon										
DO	mg/L	7.1	6.6	6.9	7.3	6.8	7.1	-	-	-
BOD	mg/L	3.0	2.0	2.5	2.4	2.1	2.3	-	-	-
COD	mg/L	12.8	11.2	12.0	15.2	13.6	14.4	-	-	-
Total coliforms	MPN/100 mL	11000	9200	10100	9200	5400	7300	-	-	-
Station: Chaskaman										
DO	mg/L	7.2	7.2	7.2	7.0	6.0	6.5	-	-	-
BOD	mg/L	3.4	2.4	2.9	4.0	3.6	3.8	-	-	-
COD	mg/L	14.2	12.0	13.1	17.6	15.2	16.4	-	-	-
Total coliforms	MPN/100 mL	16000	13000	14500	16000	9200	12600	-	-	-
Station: Khamgaon										
DO	mg/L	6.7	5.6	6.2	7.1	6.2	6.7	6.8	6.8	6.8
BOD	mg/L	4.2	3.8	4.0	6.0	4.8	5.4	6.6	6.4	6.5
COD	mg/L	18.4	16.0	17.2	28.0	20.0	24.0	50.0	38.0	44.0
Total coliforms	MPN/100 mL	35000	16000	25500	160000	35000	97500	92000	17000	54500

DATA ABSTRACT FOR SHIRUR SUBDIVISION FOR 2010-11										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
Station: Rakshewadi										
DO	mg/L	7.4	6.2	6.8	6.8	6.7	6.8	-	-	-
BOD	mg/L	4.4	4.0	4.2	5.0	4.5	4.8	-	-	-
COD	mg/L	20.0	16.8	18.4	26.0	22.0	24.0	-	-	-
Total coliforms	MPN/100 mL	28000	16000	22000	16000	16000	16000	-	-	-
Station: Daund										
DO	mg/L	6.8	6.0	6.4	7.0	6.6	6.8	7.2	6.2	6.7
BOD	mg/L	3.8	3.2	3.5	5.5	4.2	4.9	7.0	3.0	5.0
COD	mg/L	16.8	15.2	16.0	26.0	18.0	22.0	44.0	14.4	29.2
Total coliforms	MPN/100 mL	16000	16000	16000	16000	9200	12600	22000	5400	13700
Station: Nimgaon Gangurde										
DO	mg/L	6.6	6.6	6.6	6.8	5.8	6.3	6.8	6.8	6.8
BOD	mg/L	5.0	5.0	5.0	6.4	5.4	5.9	7.0	7.0	7.0
COD	mg/L	22.0	22.0	22.0	38.0	28.0	33.0	50.0	50.0	50.0
Total coliforms	MPN/100 mL	16000	16000	16000	160000	9200	84600	4600	4600	4600

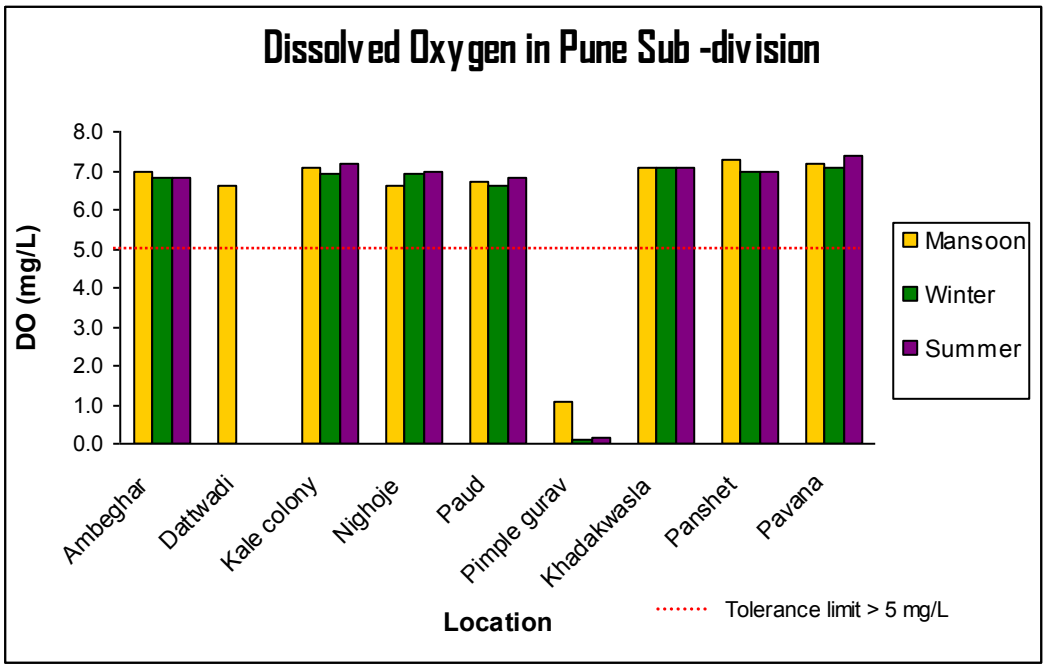
DATA ABSTRACT FOR SOLAPUR SUBDIVISION FOR 2010-11										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
Station: Ujjani										
DO	mg/L	7.2	6.6	6.9	7.2	7.0	7.1	7.2	6.6	6.9
BOD	mg/L	6.4	3.4	4.9	4.8	4.0	4.4	7.4	4.2	5.8
COD	mg/L	22.0	15.2	18.6	18.4	16.8	17.6	19.2	17.6	18.4
Total coliforms	MPN/100 mL	16000	5200	10600	16000	9200	12600	17000	13000	15000
Station: Narsihnpur										
DO	mg/L	6.8	6.0	6.4	7.0	6.3	6.7	7.2	6.8	7.0
BOD	mg/L	3.8	3.8	3.8	5.2	4.0	4.6	6.4	1.3	3.9
COD	mg/L	16.8	14.4	15.6	20.0	18.4	19.2	28.0	9.6	18.8
Total coliforms	MPN/100 mL	2400	1300	1850	4900	2200	3550	9200	2800	6000
Station: Sarati										
DO	mg/L	6.8	6.4	6.6	7.0	6.6	6.8	7.2	6.4	6.8
BOD	mg/L	3.8	3.5	3.7	4.8	3.7	4.3	6.0	5.0	5.5
COD	mg/L	15.2	14.4	14.8	21.6	17.6	19.6	30.0	24.0	27.0
Total coliforms	MPN/100 mL	7000	2400	4700	9200	7900	8550	5400	3500	4450

DATA ABSTRACT FOR SOLAPUR SUBDIVISION FOR 2010-11										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
Station: Barur										
DO	mg/L	6.5	6.5	6.5	6.6	6.6	6.6	-	-	-
BOD	mg/L	4.8	4.8	4.8	5.2	5.2	5.2	-	-	-
COD	mg/L	22.0	22.0	22.0	24.0	24.0	24.0	-	-	-
Total coliforms	MPN/100 mL	1400	1400	1400	5400	5400	5400	-	-	-
Station: Bandalgi										
DO	mg/L	7.4	7.0	7.2	7.2	6.4	6.8	7.0	7.0	7.0
BOD	mg/L	4.2	4.0	4.1	4.0	1.4	2.7	1.6	1.6	1.6
COD	mg/L	19.2	17.6	18.4	20.0	13.0	16.5	14.0	14.0	14.0
Total coliforms	MPN/100 mL	92000	35000	63500	9200	1700	5450	4300	4300	4300
Station: Devikavathe										
DO	mg/L	6.8	6.4	6.6	7.8	6.2	7.0	7.4	7.4	7.4
BOD	mg/L	4.0	3.8	3.9	4.4	1.2	2.8	1.8	1.8	1.8
COD	mg/L	20.0	18.4	19.2	22.0	10.0	16.0	12.0	12.0	12.0
Total coliforms	MPN/100 mL	5400	2400	3900	9200	2100	5650	1700	1700	1700

RESULT OBTAINED DURING 2010-2011

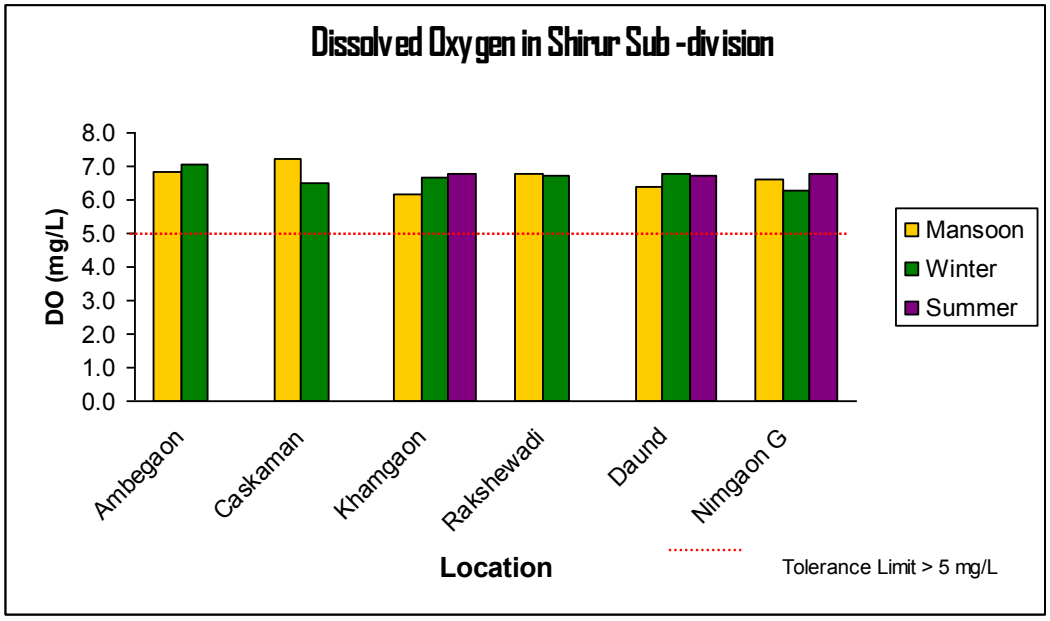
I. Graphical Representation of Dissolved Oxygen:

1. Pune Sub-Division:



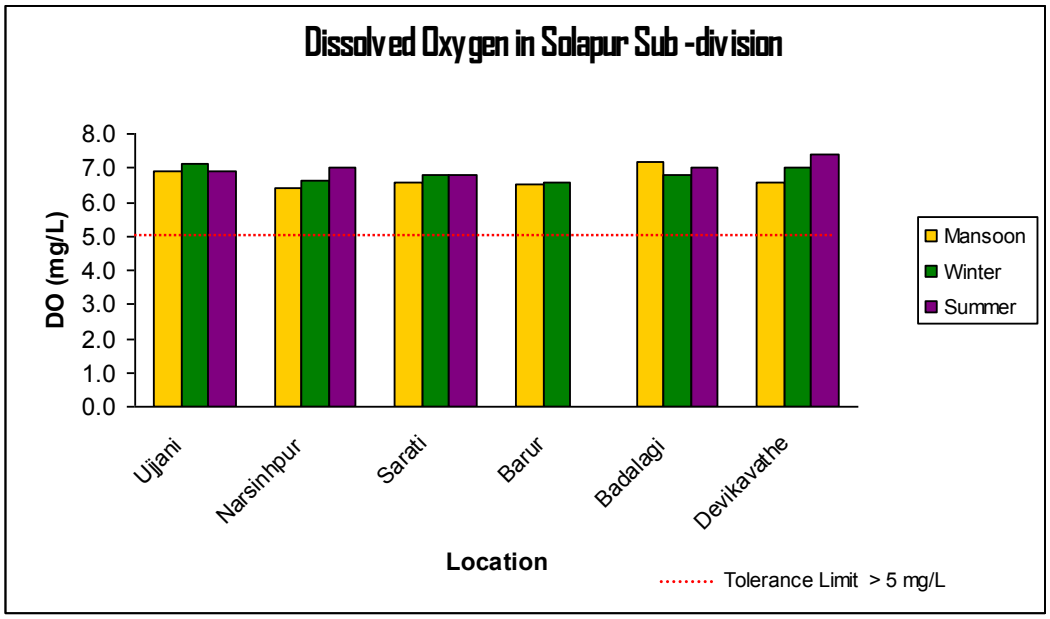
From the above graph, it can be observed that Pimple Gurav & Dattwadi location has low value of Dissolved Oxygen, where as at other remaining location the D.O. value is within limit. At Dattwadi in Winter & Summer DO value is Nil.

2. Shirur Sub-Division



From the above graph it is observed that the values of Dissolved Oxygen are within limit at all stations during all seasons.

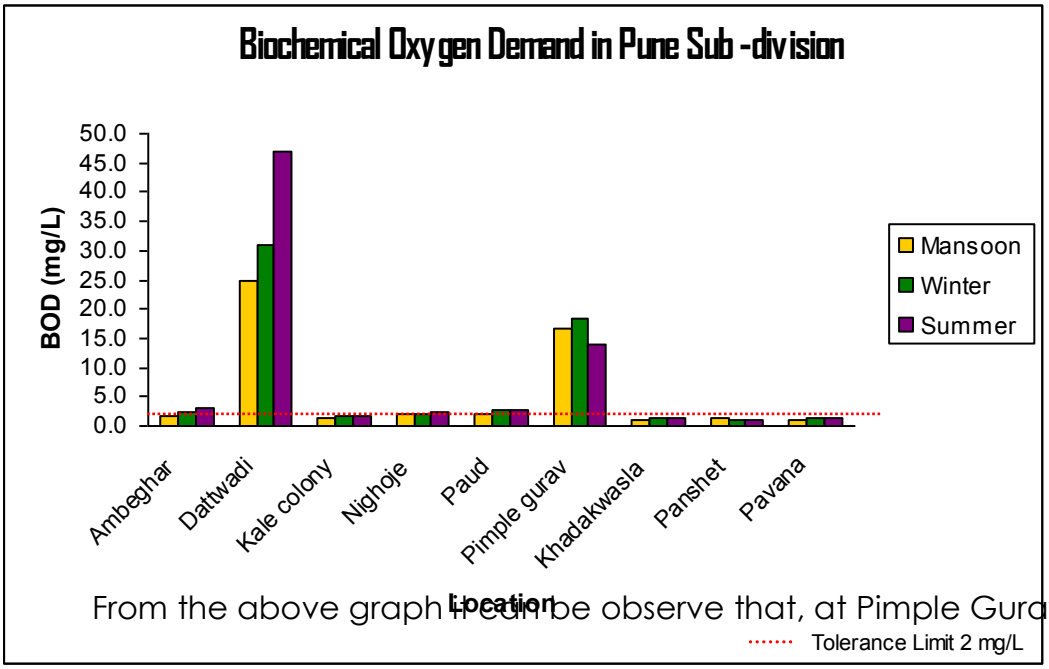
3. Solapur Sub-Division:



It is observed from graph that during at all sites during all seasons the values are within desirable limit.

II. Graphical Representation of Biochemical Oxygen Demand:

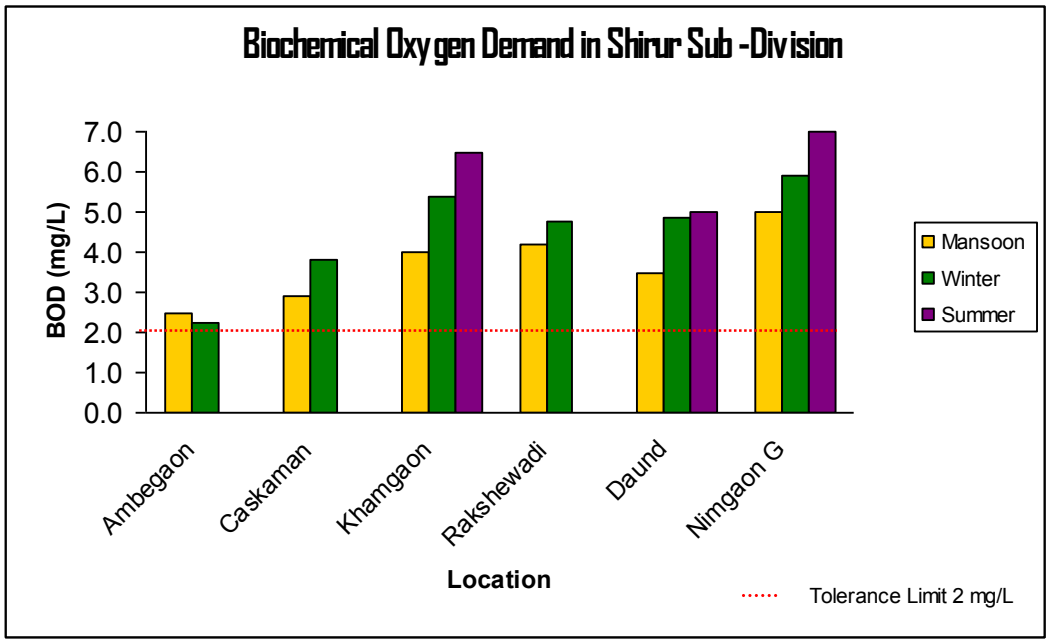
1. Pune Sub-Division:



From the above graph it can be observe that, at Pimple Gurav & Dattwadi the v

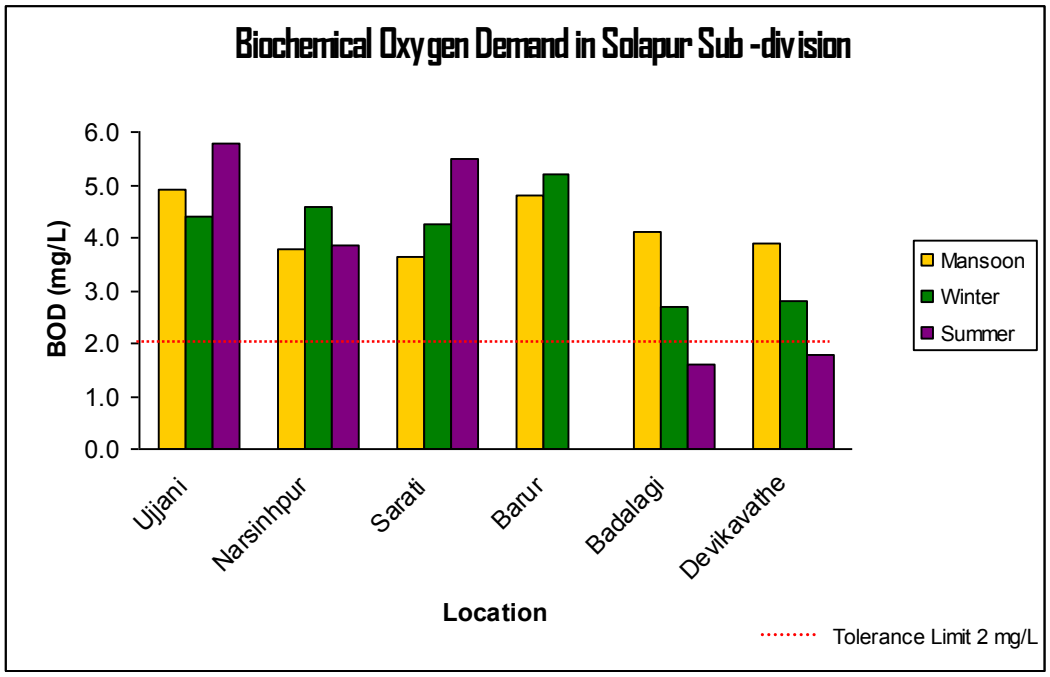
From the above graph it is observed that the values of BOD at Dattwadi & Pimple Gurav are beyond tolerance limit. It is Highest at Dattwadi during summer season.

2. Shirur Sub-Division:



It is observed that at all location values of B.O.D. are above the limit. Especially during summer at Khamgaon & Nimgaon.

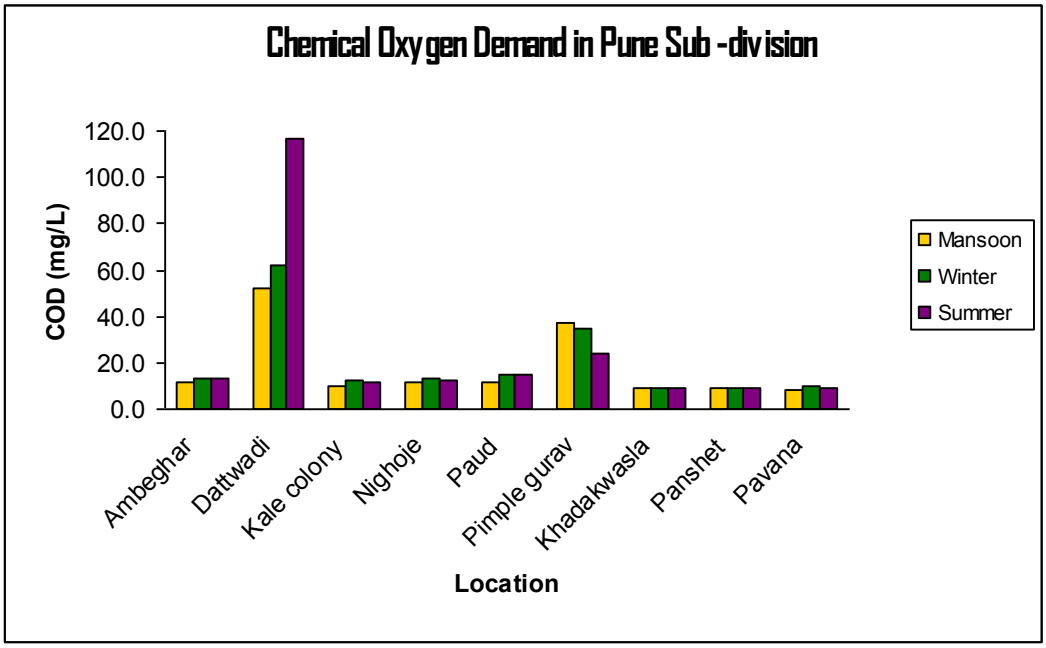
3. Solapur Sub-Division:



From the above graphical representation, it is observed that at all stations the values are above tolerance limit.

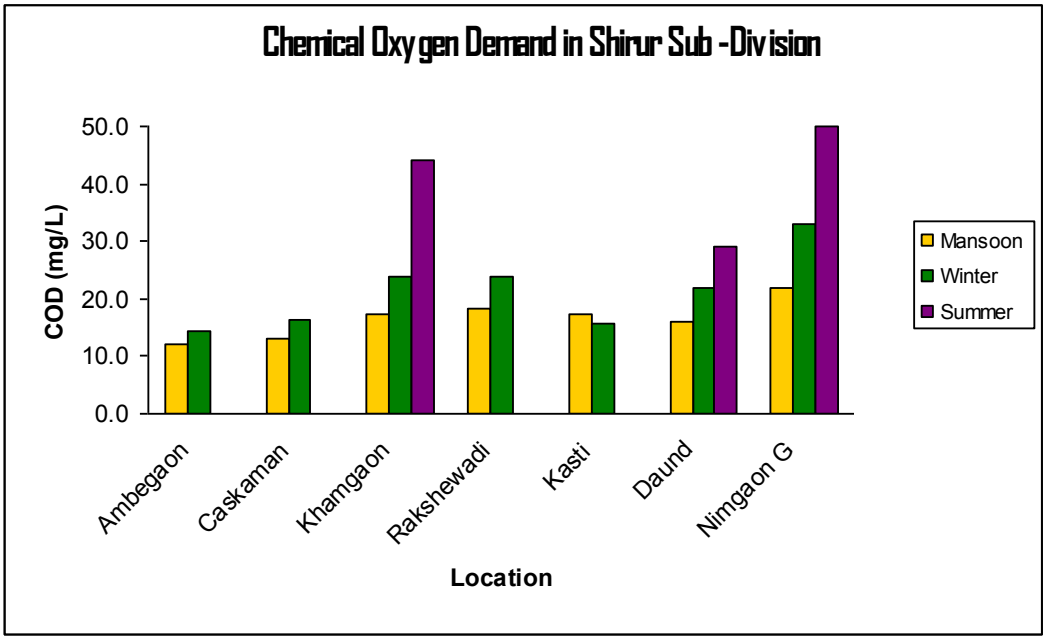
III. Graphical Representation of Chemical Oxygen Demand:

1. Pune Sub-Division:



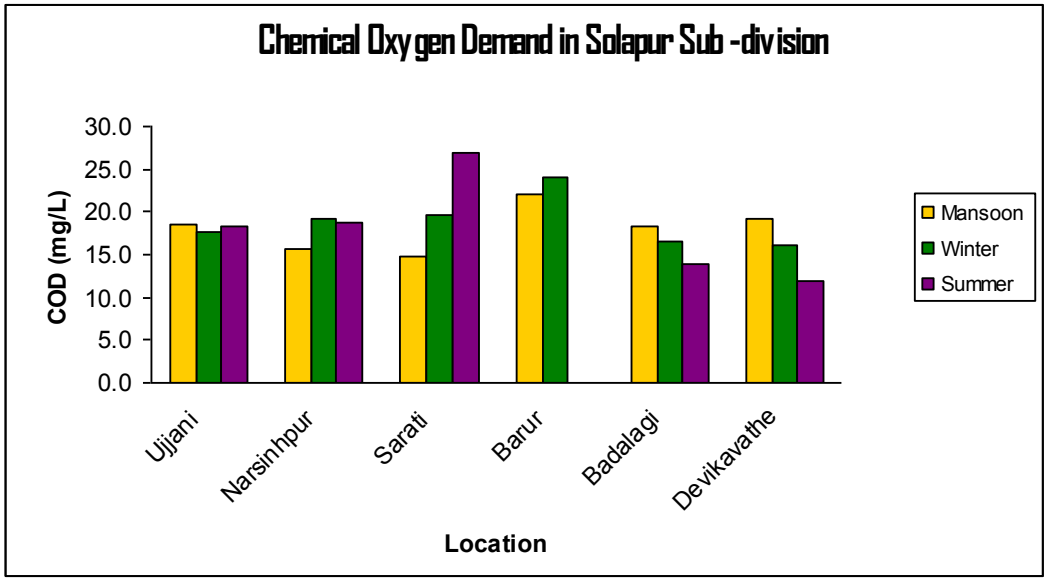
From the above graph it is observed that the value of COD at Dattwadi is highest during summer season.

2. Shirur Sub-Division :



From the above graph, it can be observed that the COD are much higher side at Nimgaon & Khamgaon especially during Summer.

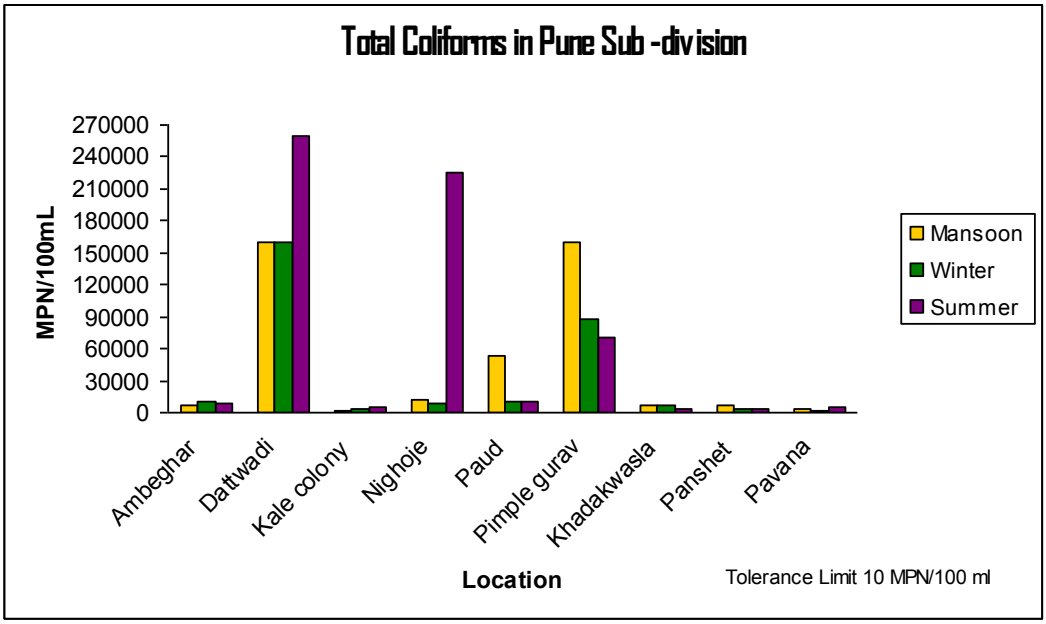
3. Solapur Sub-Division:



From the above graph, it can be observed that at every location during all the season, the value of COD is higher. It is much higher at Sarati.

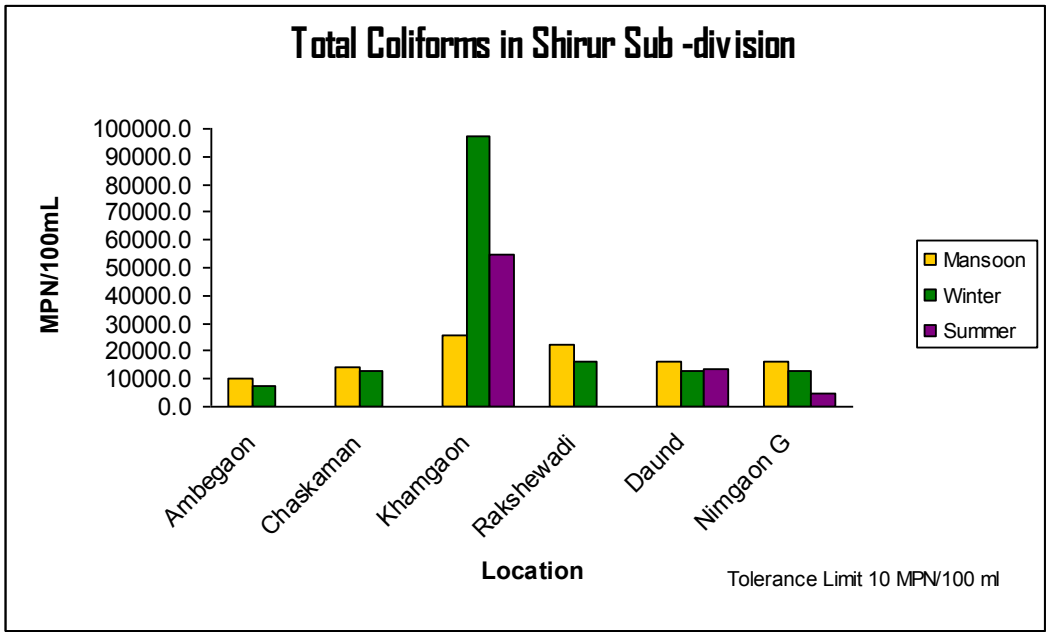
IV. Graphical Representation of Total Coliforms:

1. Pune Sub-Division:



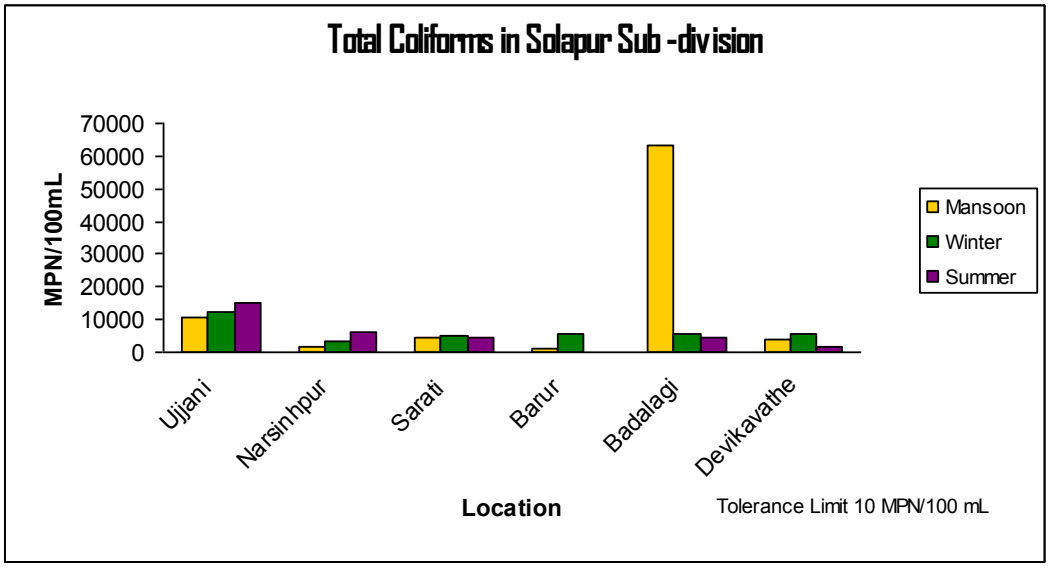
From the above graph it is observed that the values of Total Coliform are highest at Dattwadi in all season & at Nighoje in summer. At Pimple Gurav values are also high in all season.

2. Shirur Sub-Division:



From the above graph it is observed that the value of Total Coliform at each location during all the season is high than the prescribed limit especially at Khamgaon.

3. Solapur Sub-Division:



From the above graph it is observed that the value of Total Coliform at each location during all the season is higher than the prescribed limit. It is highest at Bandalgi in Mansoon.

Chapter V
CONCLUSION

CHAPTER - 5

CONCLUSION

5.1 Conclusion

Observing all the factors it can be concluded that, analysis result from all the locations have shown increase in value of Biological Oxygen Demand, Total Coliform. The value of Biological Oxygen Demand is very high, even exceeding beyond desired limit is due to the presence of organic matter, which also reduces oxygen content in the water. Water having excess Biological Oxygen Demand is not fit for human activities or consumption.

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

From the observation at Pimple Gurav, Dattwadi, Khamgaon location almost all parameters are crossing the desired limit which indicates that at the upstream of this location there are a considerable source of pollution. Hence, it can be concluded that water from all these sources is not suitable for drinking purpose and so it requires treatment before its usage.

5.2 REMEDIAL MESAURES:

If you want to help keep our waters clean, there are many things you can do to help. You can prevent water pollution of nearby rivers and lakes as well as groundwater and drinking water by following some simple guidelines in your everyday life.

- Maintain Your Septic System
- Replace your lawn and high-maintenance plants with native plants.
- Maintain your vehicle.
- Minimize your use of fertilizers, pesticides, and herbicides.

CHAPTER VI
OTHER ACTIVITIES

CHAPTER-6

OTHER ACTIVITIES

6.1 REVENUE GENERATION TO GOVERNMENT OF MAHARASHTRA

During the year 2010-2011 many clients approached to the laboratory. The valuable clients availed the facility of the laboratory are as below;

1) Lonavala Municipal Corporation
2) Central Water Commission
3) Rakesh Enterprise, Yerwada, Pune
4) Nira Devghar project, Bhatghar, Pune
5) Technogreen Environmental Solutions
6) Mahabal Enviro Engineers Pvt. Ltd

6.2 REVENUE GENERATED DURING THE PERIOD

Sr. No.	Year	Amount Received
1.	2010-2011	13,16,125

6.3 ISO Certification:

First Surveillance audit of ISO 9001:2008 was successfully completed in January 2011.

CHAPTER VII
ANNEXURE

Annual Report
On Water Quality Monitoring through Water Quality Lab Level-II, Pune for the Year 2010- 2011

ANNEXURE

List of Client 2010-2011

Sr. No.	Name of Client	Purpose of Analysis
1	Central Water Commission Upper Krishna Division Khadakwasla	Drinking Purpose
2	Mahabal Enviro Engg. Pvt. Ltd.	Waste Water & Drinking Water
3	Ashwamedh Engineers & Consultants Co-Op. Society Ltd.	Waste Water & Drinking Water
4	Rakesh Enterprise, Yerwada, Pune	Drinking Purpose
5	Mrs. Anuradha Yadav	Drinking Purpose
6	Lonavala Municipal Council	Domestic Effluent
7	Manoj Devkar, Pune	Drinking Purpose
8	Akash Kamble, Pune	Drinking Purpose
9	Nira Devghar project, Bhatghar, Pune	Drinking Porpose
10	Mr. Shivkumar Sharma, Pune	Drinking Porpose
11	Technogreen Environmental Solutions, Pune	Domestic & Industrial Effluent

QUALITY POLICY

We at water Quality lab – level 2, Pune are committed to provide water testing services to customers as well as all interested parties as per their needs & expectations to achieve their total satisfaction.

This shall be achieved through

- Continual improvement in all process
- By effective implementation of QMS as per the ISO 9001:2008
- By over all development in all employee's

DATE: 01st August, 2009

Er. A. S. Mehtre

Executive Engineer

Hydrology Project Division, Pune

Management of WQPL ensure 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.

Indian Register Quality Systems

(A Department of Indian Register of Shipping)
52A, Adi Shankaracharya Marg, Opp. Powai Lake, Powai, Mumbai - 400 072. India.
ACCREDITED BY THE RvA

MGMT. SYS.
RvA C 071

Certificate Of Approval

This is to certify that the Quality Management System of

Water Quality Laboratory Level II

Bungalow No. 2, Near Yerwada Post Office, Yerwada,
Pune – 411 006

has been found to conform
to the requirements of the Standard:

ISO 9001 : 2008

with respect to the following scope:

Water Testing and River Water Monitoring
for Water Quality

This approval is subject to continued satisfactory maintenance of the Quality Management System of the Organisation to the above Standard which will be monitored by IRQS.

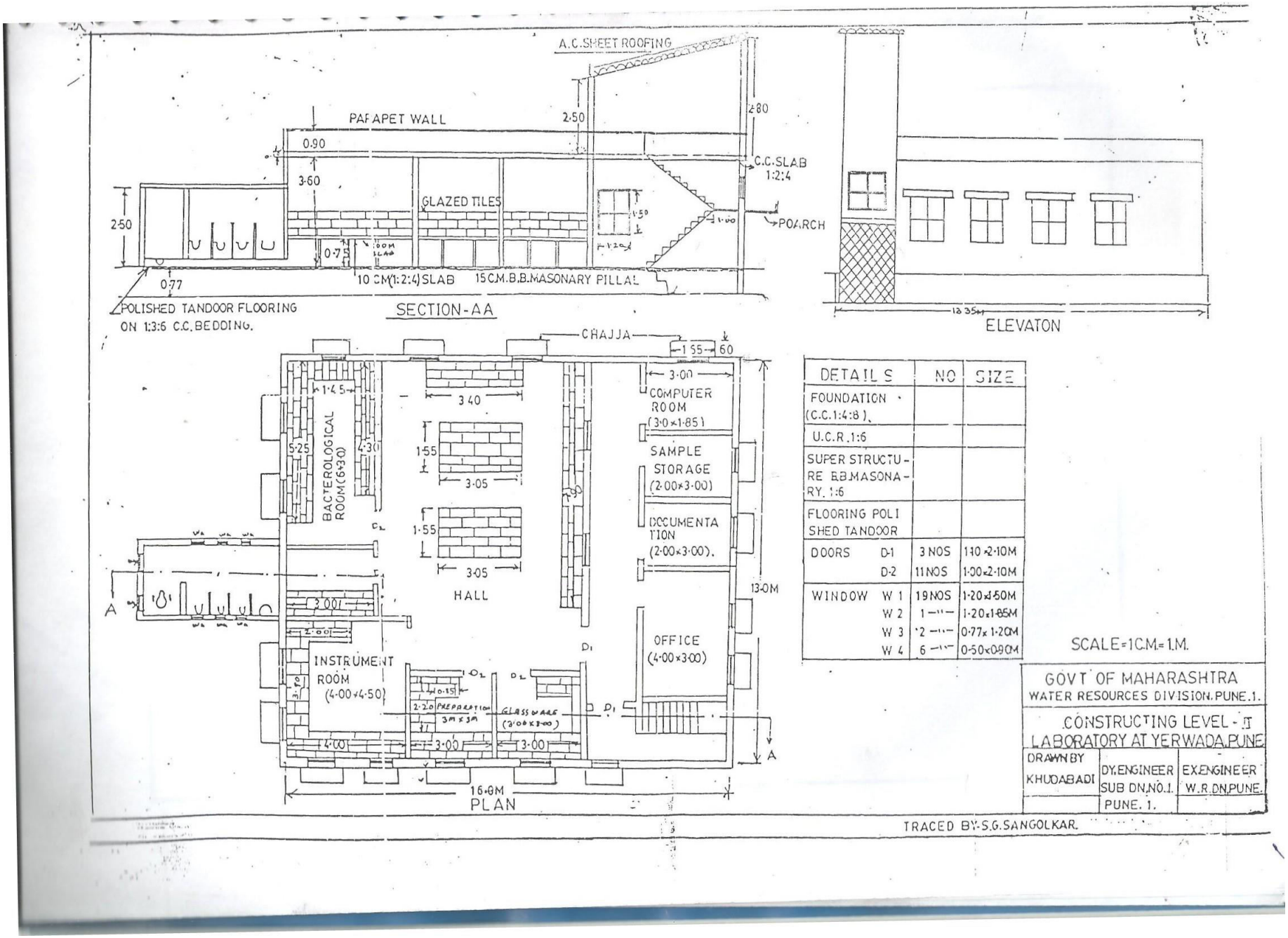
Certificate No.: ***IRQS/1010072*** issued at Mumbai on: *9th February 2010*

Original Approval Date : *9th February 2010*
Current Certificate Expiry: ***8th February 2013***

S. Kumar
Managing Director

The use of the Accreditation Mark indicates accreditation with respect to activities covered by the certificate with accreditation no. C 071

Conditions overleaf



DETAILS		NO	SIZE
FOUNDATION (C.C.1:4:8).			
U.C.R.1:6			
SUPER STRUCTURE B.B.MASONARY. 1:6			
FLOORING POLISHED TANDOOR			
DOORS	D-1	3 NOS	1.10×2.10M
	D-2	11 NOS	1.00×2.10M
WINDOW	W 1	19 NOS	1.20×1.50M
	W 2	1 —"—	1.20×1.85M
	W 3	2 —"—	0.77×1.20M
	W 4	6 —"—	0.50×0.90M

SCALE=1C.M.=1M.

GOVT OF MAHARASHTRA
WATER RESOURCES DIVISION, PUNE.1.

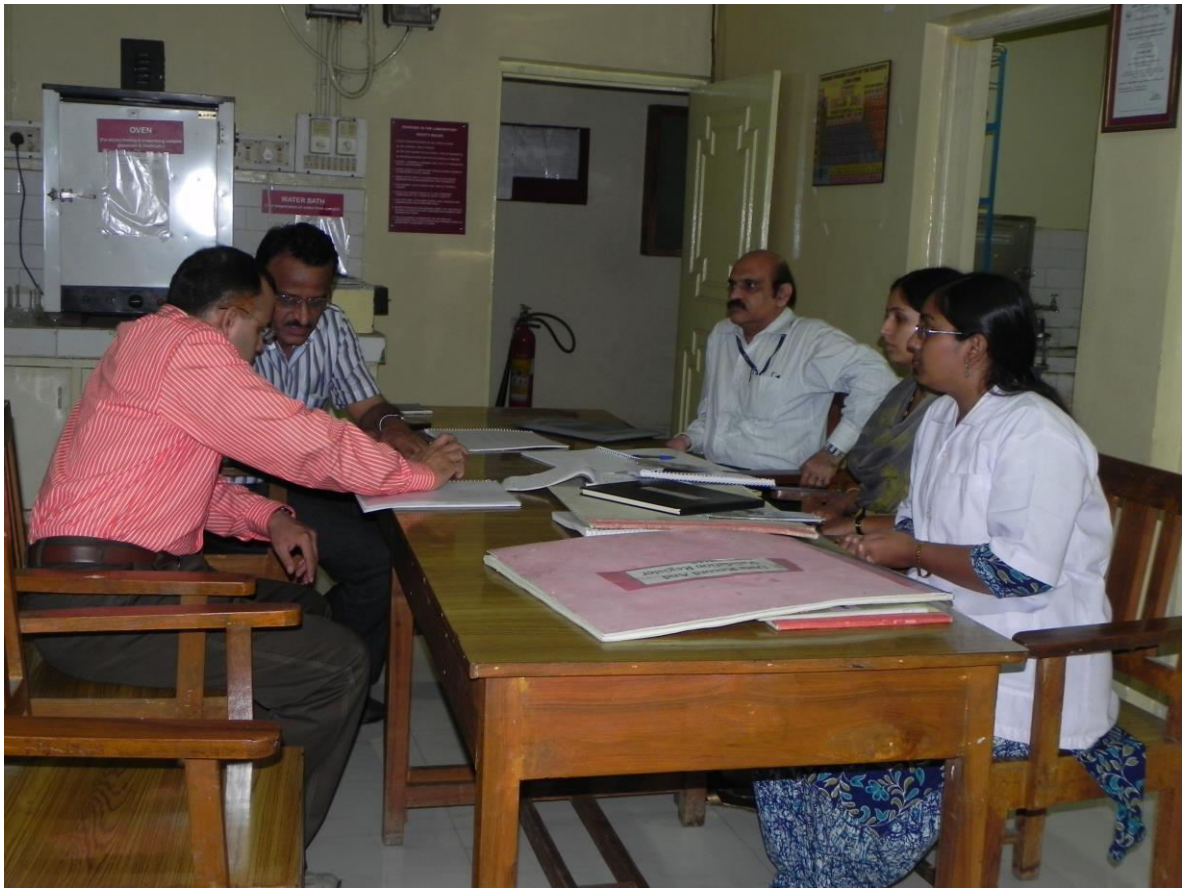
CONSTRUCTING LEVEL - II
LABORATORY AT YERWADA, PUNE.

DRAWN BY	DY.ENGINEER	EX.ENGINEER
KHUDABADI	SUB DN.NO.1.	W.R DN.PUNE.
	PUNE. 1.	

TRACED BY-S.G.SANGOLKAR.

VISITOR'S COMMENT

CPCB VISIT ON 23/11/2010



Data Management seen to be excellent.

R.M. Bhardwaj
Scientist 'D',
CPCB, Delhi

PHOTOGRAPHS

Visit on 05/02/2011 by Superintendent Engineer & Executive Engineer

Visit on 23/11/2010 by Mr. R.M. Bhardwaj, Scientist 'D', CPCB, Delhi

Visit by Government Analyst to Ambegaon WQ Station on 06/08/2010

Within Lab AQC Exercise carried out in WQ Lab Pune
Fluoride Analysis

Jurisdiction Map of Laboratory