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GOVERNMENT OF MAHARASHTRA
WATER RESOURCES DEPARTMENT

HYDROLOGY PROJECT (SW)

ANNUAL REPORT

WATER QUALITY LABORATORY LEVEL-II PUNE
YEAR 2013

SUPERINTENDING 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 about Rivers Krishna, Bhima and its Tributaries in Maharashtra for the period of June 2012 to May 2013 analyzed by the agency M/s.Papilon Enviro Engineers Pvt. Ltd., Aurangabad and reviewed by Water Resources Department. The contract towards Operation and Maintenance of Water Quality Lab Level-II, Pune for the said period is awarded to above agency. The data has been interpreted to know the affected locations.

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

This Annual Report attempts to briefly describe an overview and general conclusion based on the basis of water quality data of water samples collected from selected locations for predefined frequencies for the reported period. This report also provides 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 2012- 2013

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 'life'. It is one of the fundamental needs on the globe. Water is probably the only natural resource to touch all aspects of human civilization from agricultural and industrial development to cultural and religious values embedded in society.

The total water amount on the earth is about 1.35 billion cubic kilometers. About 97.1 % has been locked into oceans as saltwater. Ice sheets and glaciers have arrested 2.1 %. Only 0.2 % is the fresh water present on the earth, which can be used by human for variety of purposes. Remaining 0.6 % is in underground form. But unfortunately it has been getting polluted day by day due to different anthropogenic activities. So it is burning need, to conserve the water and prevent it from every type of pollution. There should be proper water quality investigation and management. This could be possible by continuous Water Quality Monitoring.

1.2 Water Quality Monitoring –

The main objectives of Hydrology Project for water quality monitoring in Krishna and Bhima Basin are -

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

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 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 2012-13. 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	2012-13	8	43	4	44	99
Total Samples analyzed during reporting period						**99**

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 meteorological Data Processing Division, Nashik for further dissemination to user end.

Furthermore to get an idea about data generated for the period, it is decided and instructed to analyze 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 parameters are within tolerance limit.

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

i) DO ii) BOD iii)COD

Bacteriological parameter like Total Coli form is also exceeding the limits.

From the observations at Khamgaon, Daund and Ujjani 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, analyzed results from some locations have shown increase in value of Biological Oxygen Demand and Total Coli form. 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_1 and S_1. This indicates that the water flowing along these locations is mostly suitable for irrigation purpose with most crop with most soil . For drinking purpose, it should be treated before use.

But with respect to parameters, locations like Khamgaon, Daund and Ujjani are critical for certain parameters like Biological Oxygen Demand, Chemical Oxygen Demand and Total Coli forms. In the point of consideration for above location water is not suitable for irrigation and 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.
- There are many effective ways to conserve water in and around your home.

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.
- Reduce, Refuse, Reuse, and Recycle Materials whenever possible
- 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:

"Water" is a prime natural resource and is considered as a precious national asset. It is a major constituent of all living beings. Water is available in two basic forms i.e. Surface water and Ground water. Water is used for various purposes ranging from domestic, agricultural, industrial & allied purposes. Water is an essential for human life and the presence of reliable source of water is vital factor for the establishment of a community. Apart from its life supporting ability, water also has a potential for spreading ill health and diseases. Thus availability and importance of safe drinking water was realized and practiced thousands of years ago by man. At any point, water quality of a lotic system is intimately associated with the entire water quality of river basin. Hence, water quality monitoring becomes a fundamental tool for river basin planning and management. The effective monitoring and management of water quality to safeguard the precious natural reverie system is a challenge for the scientific and engineering communities alike. In recent years agencies involved in water quality management have expressed their concern about the problem of representative water quality monitoring network with a view to design and optimize water quality monitoring network.

2.2 Water Quality Network Layout

Water Quality of Rivers Krishna, Bhima and its tributaries is being monitored by Central Water Commission, Water Resources Division of Maharashtra and 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 is being carried out by Hydrology Project sub-division Pune under Hydrology Project Division.

In Bhima Basin Water Quality is monitored by Hydrology Project Division Pune at 12 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 location, station types and rivers under Hydrology Project, Pune are given in Table 1(Page No-12).

Out of 15 Water Quality stations on tributaries of Bhima, 11 are trend stations and 4 are of Dam Location. Fig 1(page no. 46) shows Network of Water Quality Monitoring stations of various types in the jurisdiction of water quality lab level-II under Hydrology Project sub-division, Pune.

2.2 Water Quality Monitoring - Objectives

The main objectives of Hydrology Project for water quality monitoring in Krishna and Bhima Basin are -

1) Establish Trend stations.
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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 2012-13. 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 2012-13 are considered.

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

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Total Samples analyzed during reporting period						**99**

2.4 Other activities

During the year 2012-13 many clients approached the laboratory. The clients availed the facility of the laboratory are as below;

1) Central Water Commission Upper Krishna Division Khadakwasla.
2) Irrigation Research Sub-division, Khed, Ratnagiri.
3) Deputy Director Sports & Youth Services , Pune.
4) Technogreen Environmental Solutions, Pune.
5) Lokmat Media Pvt. Ltd., Pune
6) Ujjani Dam Mgmt. Division , Bhimanagar.

REVENUE GENERATED DURING THE REPORTING PERIOD

Sr. No.	Year	Amount Received
1.	2012-2013	79,142

2.5 Extended Scope of Laboratory

Under Hydrology Project(SW) Maharashtra Water Quality Monitoring is being carried out with prescribed W.Q. Network with 6 Level-II and 38 Level-I Labs followed by 170 sampling locations spread all over the State.

Renewal audit of ISO 9001:2008 was successfully completed in November 2012, lab has been certified for next 3years ie. Upto Feb 2016.

AQC Exercise organized by CPCB – This lab participated in 29th AQC Exercise organized by CPCB during the reported period and Water Quality Lab Level II secured 75 % 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 HDUG member of Hydrology Project.

SALIENT FEATURES OF LABORATORY:

Latitude	:	N-18^0 33' 30"
Longitude	:	E- 73^0 53' 42"
Rivers	:	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	:	0 Nos.
No. of Baseline Sample locations	:	0 Nos.
No. of Trend Sample Locations	:	11 Nos.
No. of Reservoir Locations	:	4 Nos.
No. of Parameters Analyzed	:	31 Nos.
Staff Position	:	Work of Operation & Maintenance of Lab. on annual contract basis.
Government staff related to the laboratory	:	1. Shri. U. V. Parvate Executive Engineer 2. Shri. A.D. Gumaste Sub Divisional Engineer 3. Mrs. S.K. Kasar Govt. Analyst
Lab. Operating Agency	:	M/S Papilon Enviro Engg Pvt. Ltd.
Staff working in the laboratory	:	1. Sheetal Kale Chief Chemist 2. Rahul Nagawade Field Chemist 3. Akshara Joshi Chemist 4. Sangeeta Arlimaar Chemist 5. Gautam Dhone Lab Attendant

DATA COLLECTION, PLANNING and HYDROLOGY CIRCLE NASHIK

WATER QUALITY LAB, LEVEL – II PUNE

ORGANISATION CHART

SUPERINTENDING ENGINEER,
DATA COLLECTION, PLANNING AND 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

Table - 1

List of sampling locations under jurisdiction of Water Quality lab level II -@ Pune 2012-2013

SR. NO.	NAME OF STATION	DISTRICT	TAHASIL	NAME OF RIVER
Trend Station				
1	Ambegaon	Pune	Junner	Ghod
2.	Ambeghar	Pune	Bhor	Nira
3.	Chaskaman	Pune	Rajgurunagar	Bhima
4.	Daund	Pune	Daund	Bhima
5.	Kasti	Ahmadnagar	Shrigonda	Ghod
6.	Khamgaon	Pune	Daund	Mula-Mutha
7.	Narsinhpur	Pune	Indapur	Bhima
8.	Nimgaon-Gangurde	Ahmadnagar	Karjat	Sina
9.	Paud	Pune	Mulshi	Mula
10.	Rakshewadi	Pune	Shirur	Bhima
11.	Sarati	Solapur	Malshirus	Nira
Reservoirs				
12.	Khadakwasla Dam	Pune	Haveli	Mutha
13.	Panshet Dam	Pune	Maval	Ambi
14.	Pavana Dam	Pune	Maval	Pavana
15.	Ujjani Dam	Pune	Indapur	Bhima

Chapter III
METHODOLOGY

CHAPTER□□

METHODOLOGY

3.1 General:

This laboratory covers Surface Water component which covers Rivers and Reservoir Locations in Krishna and Bhima basins in Maharashtra.

3.2 Rivers

Krishna river rises at Mahabaleswar near the Jor village in the extreme north of Wai taluka, district satara, Maharashtra in the west and meets the Bay of Bengal at Hamasaladeevi (near Avanigadda) in Andhra Pradesh, on the east coast. It also flows through the state of Karnataka. The delta of this river is one of the most fertile regions in India and was the home to ancient Satavahana. Vijayawada is the largest city on the River Krishna. Sangli is the largest city on the river Krishna in Maharashtra state.

3.3 Water Quality Monitoring - Objectives

Observations of analysis of physical and 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.

3.3 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 analyze 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 2011-12. 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

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Total Samples analyzed during reporting period						**99**

3.4 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 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

Sample Collection from Water Quality Stations.

Treatment: D.O. Fixing, Preservation of sample for required parameters, 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

Tests are carried out in lab as per Protocols. These tests are: Microbiological test, Chlorophyll-a, pH, D.O., B.O.D, Ammonia, Nitrate, TDS, TSS, C.O.D., Turbidity, Alkalinity, Chloride, Boron, Sodium, Total Hardness, Phosphorous, etc.

Observations & calculations of all Analyzed Parameters are entered in the calculation 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 into SWEDS Software

Data sent to Executive Engineer Hydro metrological Data Processing Division, Nashik for further action

Methodology For the analysis of Water Quality samples the following parameters were analyzed during the Period 2012 – 2013

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

Annual Report on
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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						**99**

Chapter IV
RESULT & OBSERVATIONS

CHAPTER-4

RESULTS AND OBSERVATIONS

4.1 General

Water quality monitoring and management is an issue that requires a serious thought, concern and financial assistance to preserve our costly, shimmering, life saving liquid from pollution. Apart from this, intellectual community should play an active role to update institutional capacities by providing strong and economically feasible means of solutions and recommendations to reform the water related issues.

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 rivers 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 and utilized for preparing the Annual Report by performing some specific exercise. This data is 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 2012-2013 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 and chemical parameters analyzed for each location individually and 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:

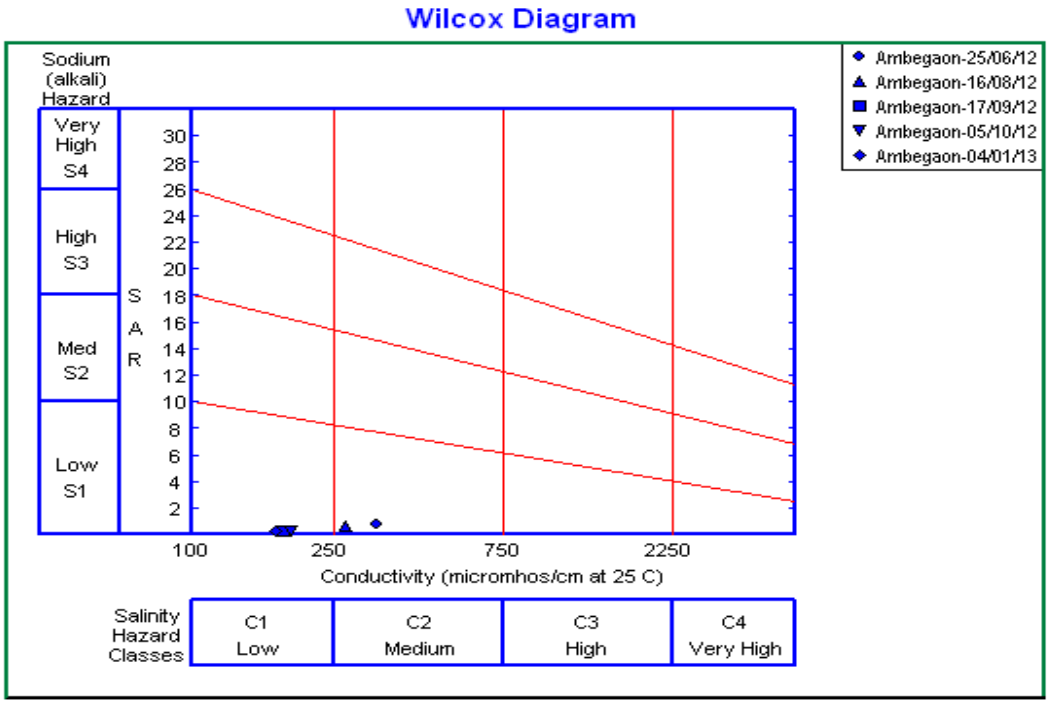
After observing all this data it is clear that most of the physical parameters are within tolerance limit except at few locations, like Daund, and Khamgaon, etc.

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

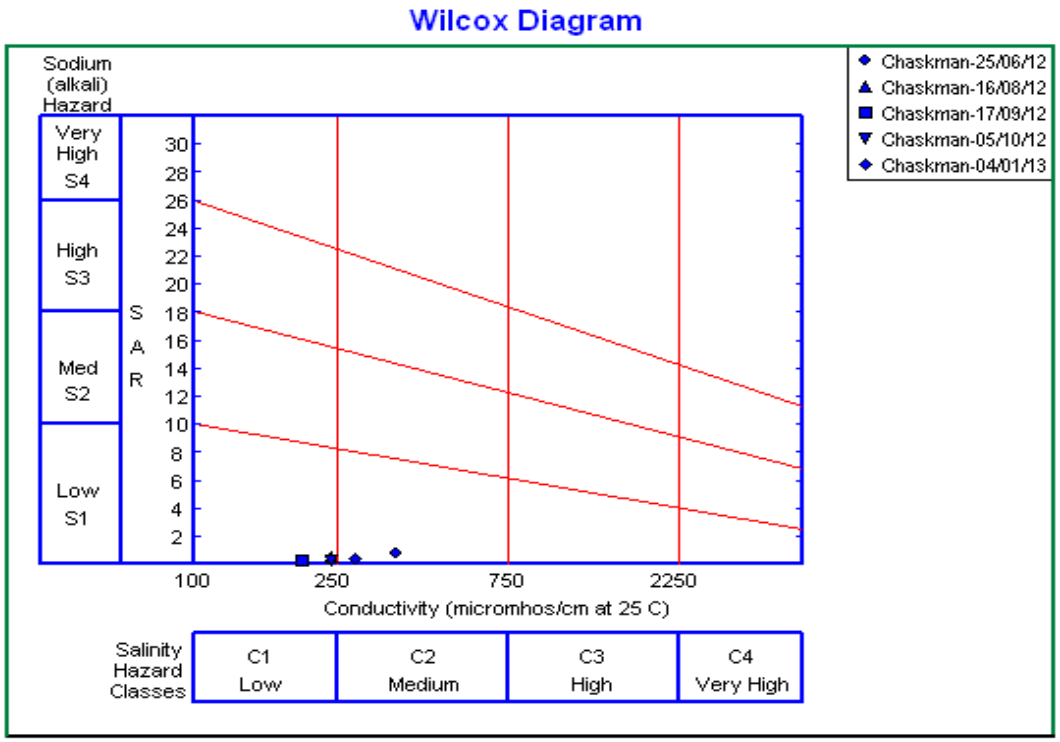
i) DO ii) BOD iii)COD

Bacteriological parameter like Total Coliform is also exceeding the limits.

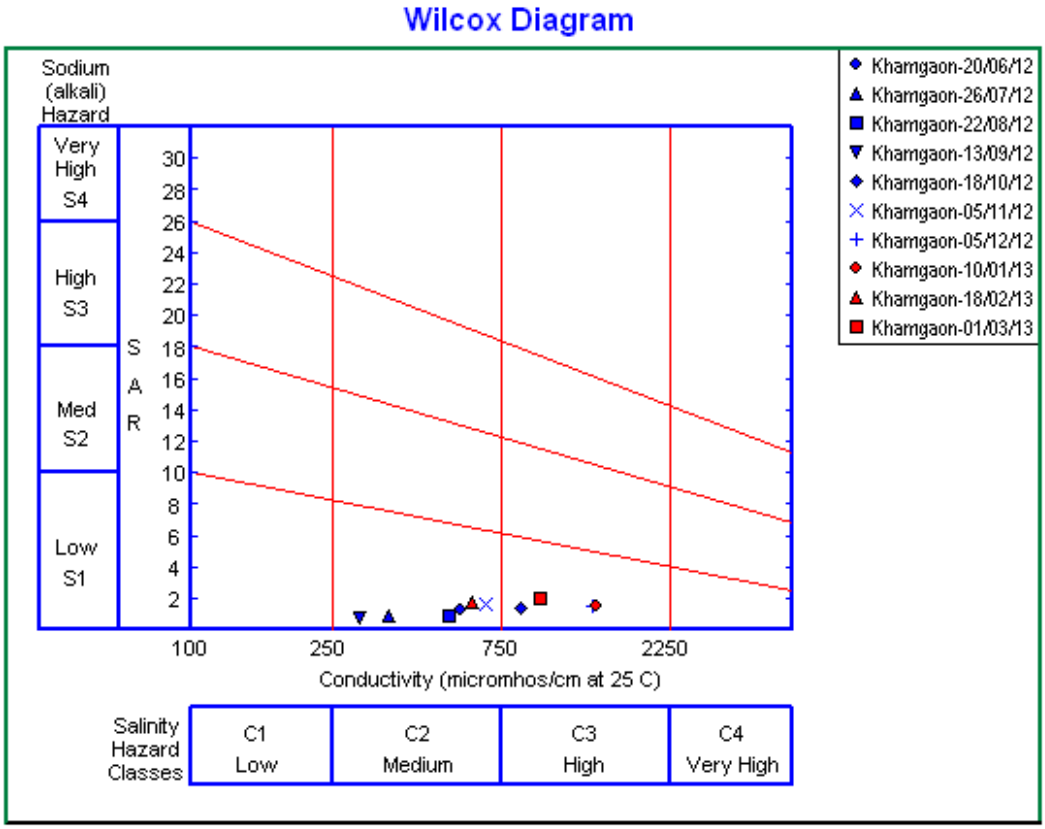
Classification of location on the basis of Wilcox technique for the use of water for irrigation purpose



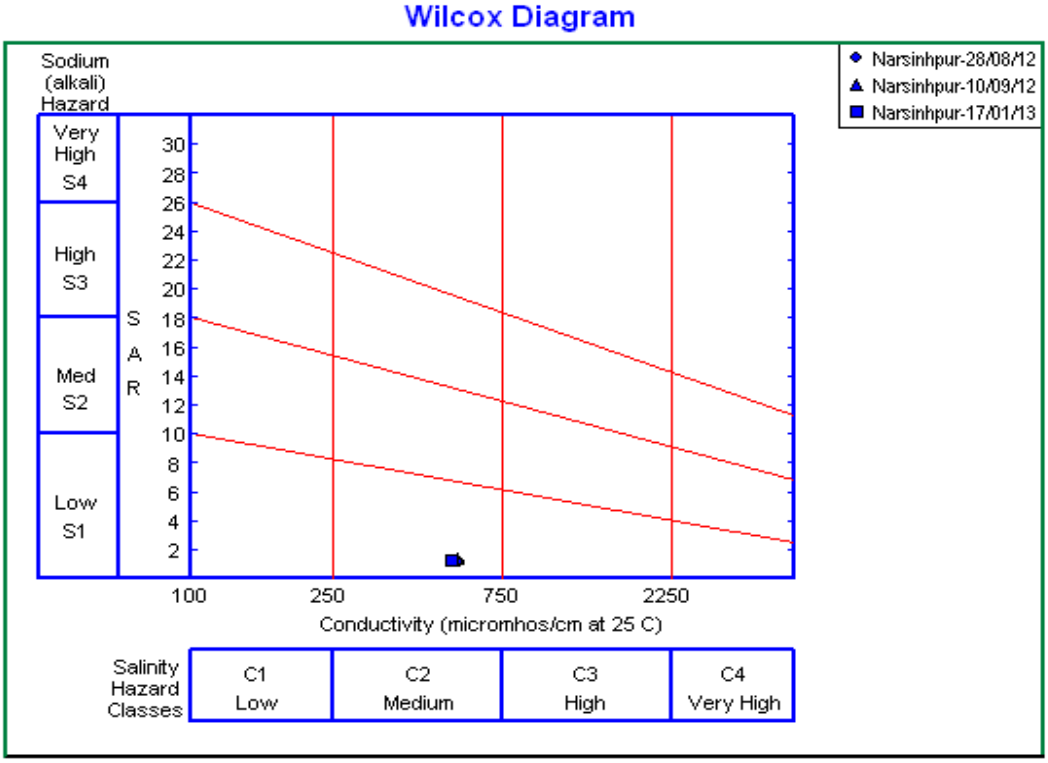
Wilcox diagram for Ambegaon



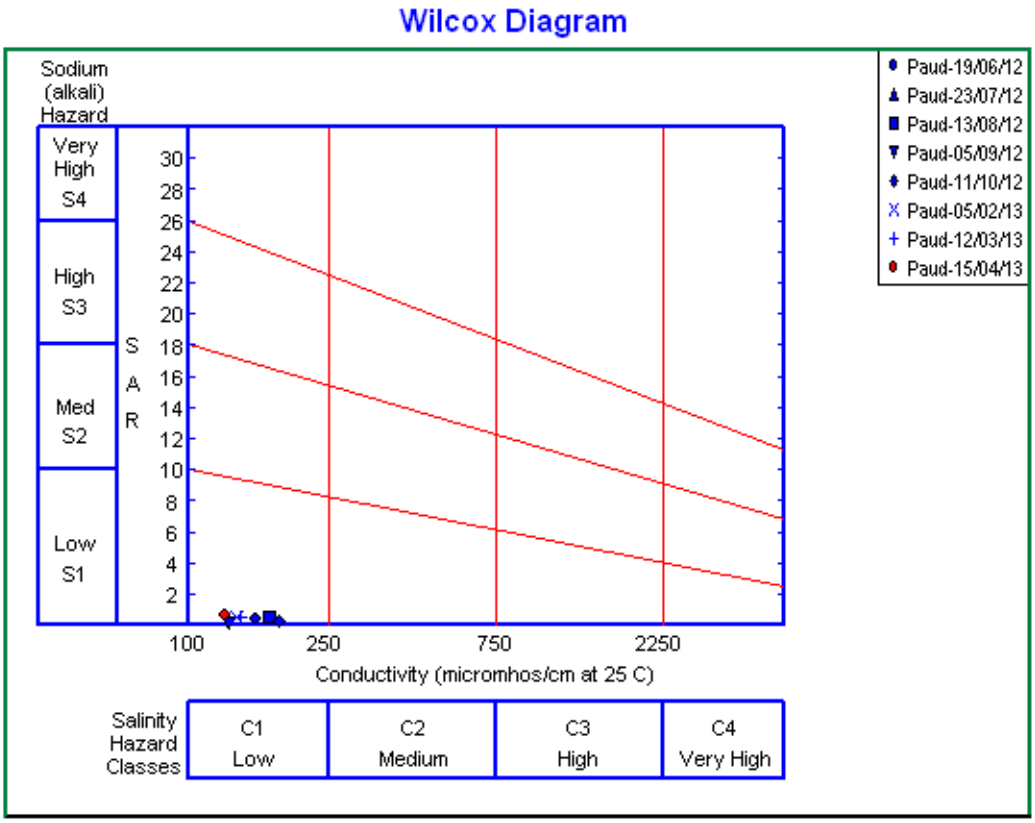
Wilcox diagram for Chaskaman



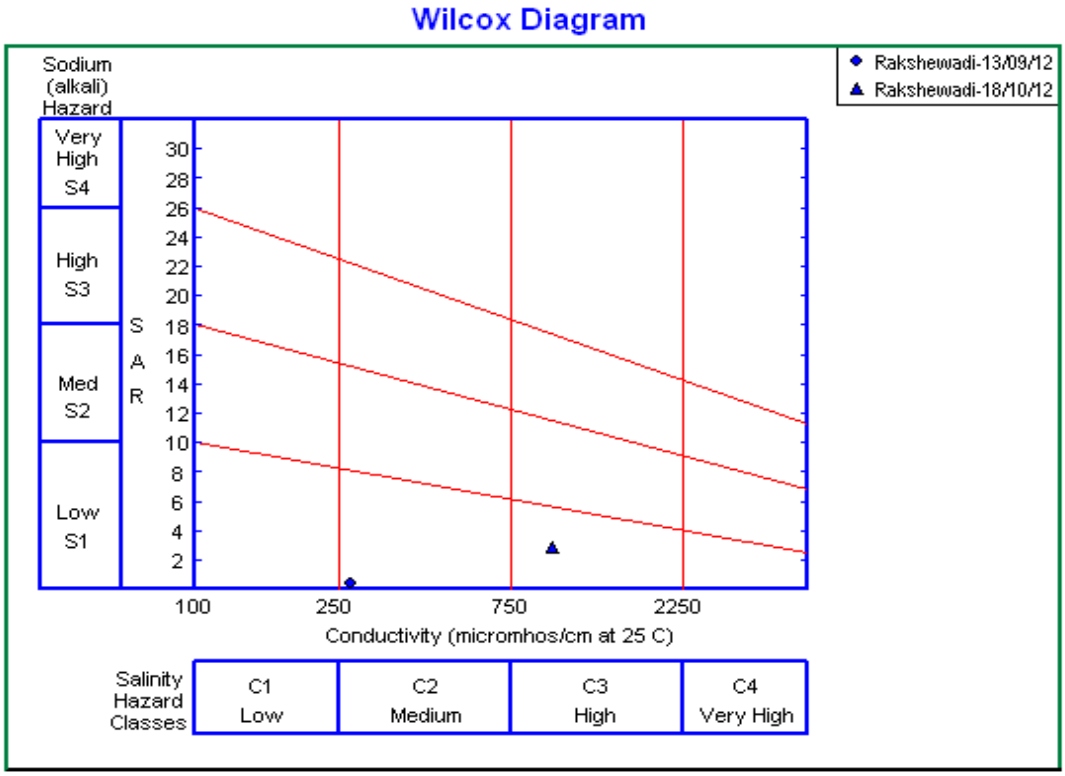
Wilcox diagram for Khamgaon



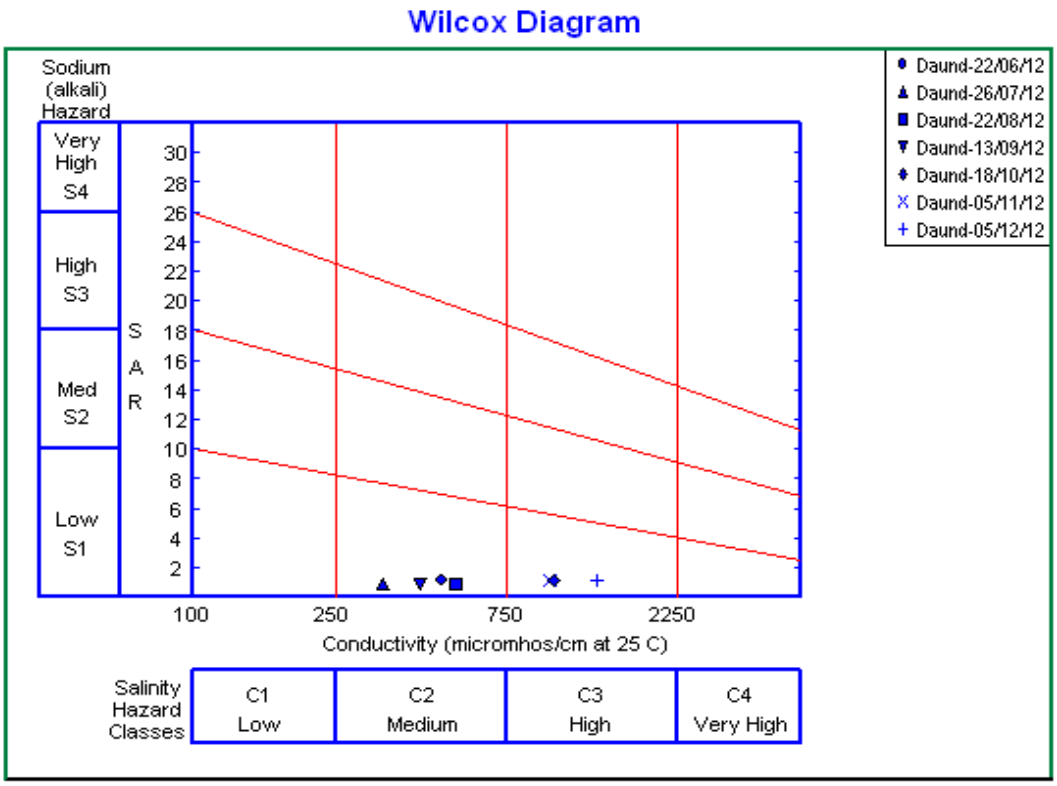
Wilcox diagram for Narsinhpur



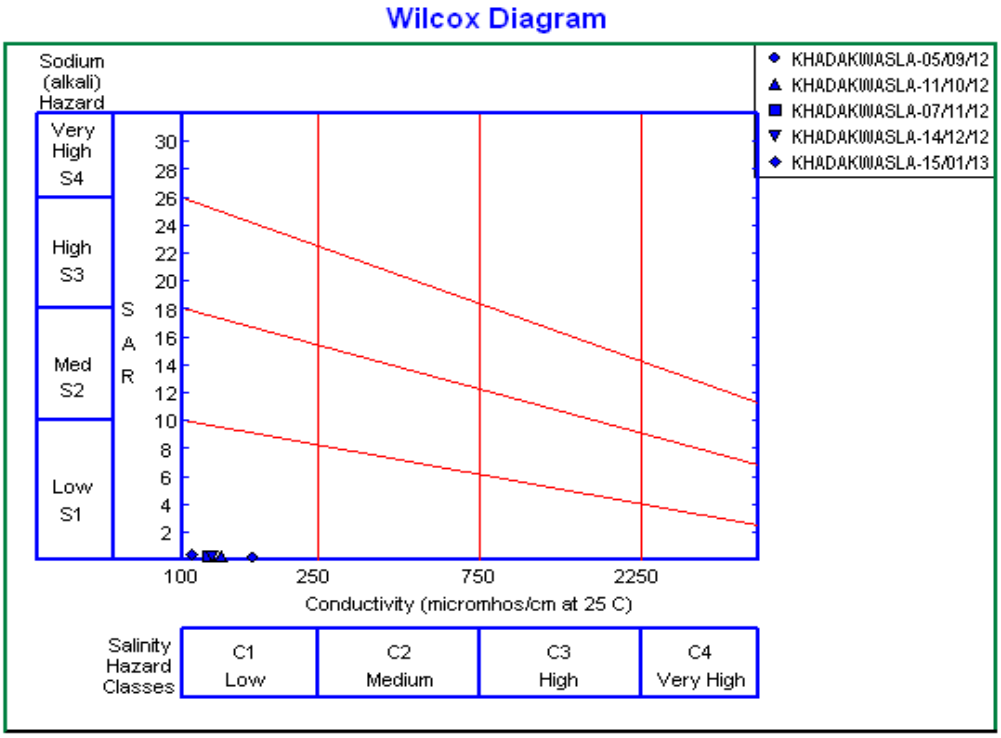
Wilcox diagram for Paud



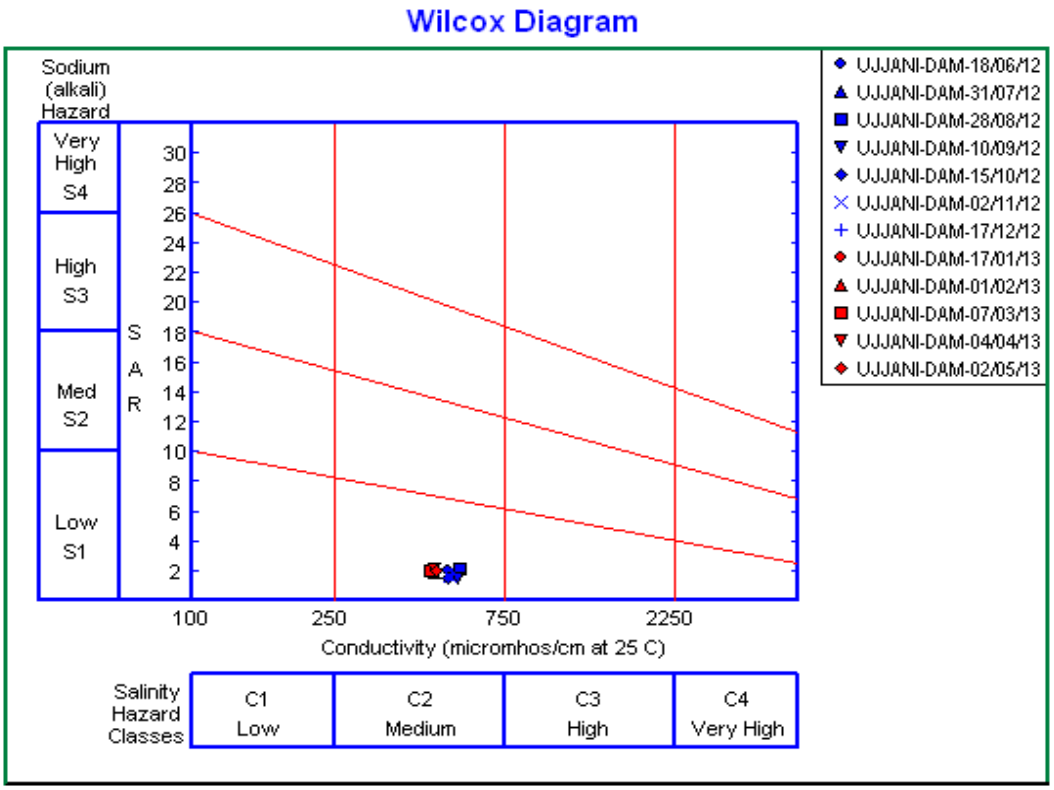
Wilcox diagram for Rakshewadi



Wilcox diagram for Daund



Wilcox diagram for Khadkwasala Dam



Wilcox diagram for Ujjani Dam

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

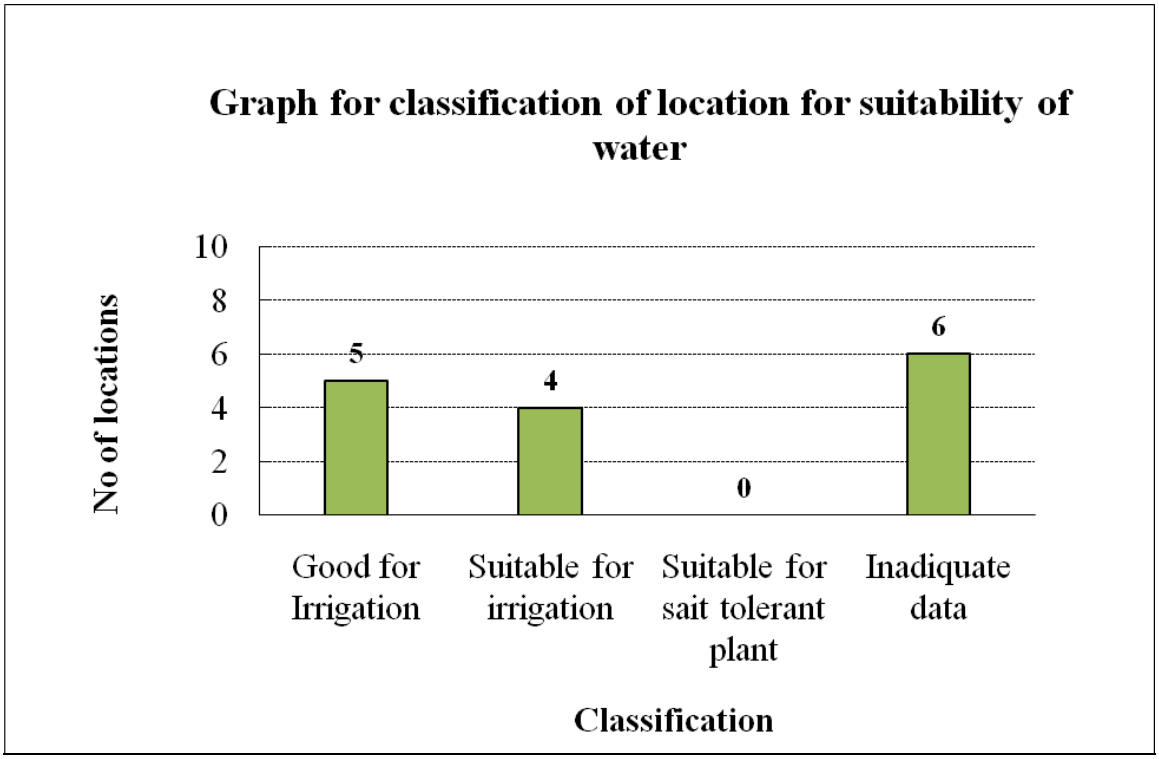
I. Trend Stations

Sr. No.	Name of Location	Year	Class as per Wilcox technique	Recommendation
Bhima River				
1	Daund	2012-2013	S1 & C2	Water is suitable for Irrigation purpose.
2	Narsinhpur	2012-2013	S1 & C2	Water is suitable for Irrigation purpose.
3	Rakshewadi	2012-2013	S1	Unable to classify because of inadequate data.
4	Chaskaman	2012-2013	S1 & C1	Water is suitable for Irrigation purpose for most crops with most soil.
Nira River				
1	Ambeghar	2012-2013	S1 & C1	Water is suitable for Irrigation purpose for most crops with most soil.
2	Sarati	2012-2013	-	Data not available.
Ghod River				
1	Ambegaon	2012-2013	S1 & C1	Water is suitable for Irrigation purpose for most crops with most soil.
2	Kashti	2012-2013	-	Data not available.
Sina River				
1	Nimgaon	2012-2013	-	Data not available.
Mula- Mutha River				
1	Khamgaon	2012-2013	S1 & C2	Water is suitable for Irrigation purpose.
Mula River				
1	Paud	2012-2013	S1 & C1	Water is suitable for Irrigation purpose for most crops with most soil.
II. Dam Locations				
1	Khadkwasala	2012-2013	S1 & C1	Water is suitable for Irrigation purpose for most crops with most soil.
2	Panshet	2012-2013	S1	Unable to classify because of inadequate data.
3	Pavana	2012-2013	S1	Unable to classify because of inadequate data.
4	Ujjani	2012-2013	S1 & C2	Water is suitable for Irrigation purpose.

Sr. No.	River	Year	Observations
1	Bhima	2012-2013	Along Bhima River there are 4 locations. Above (ref. table) classification, shows that out of 4 locations, 2 locations namely Narsinhpur & Dund, water is suitable for Irrigation purpose. At Chaskaman, water is suitable for Irrigation purpose for most crops with most soil and Rakshewadi, unable to classify because of inadequate data.
2	Nira	2012-2013	Along Nira River there are 2 Locations. Above (ref. Table) classification shows that at 1 location i.e. Ambeghar, water is suitable for Irrigation with most crops on most soil, and at Sarati, data is not available.
3	Ghod	2012-2013	Along Ghod River there are 2 Locations. Above (ref. table) classification shows that at both locations i.e. Ambegaon water is suitable for Irrigation purpose for most crops with most soil, and at Kashti data is not available.
4	Sina	2012-2013	Along Sina River there is 1 Location. Above (ref. table) classification shows that at Nimgaon Gangurde data is not available.
5	Mula-Mutha	2012-2013	Along Mula-Mutha River there is 1 Location. Above (ref. table) classification shows that at Khamgaon water is suitable for irrigation purpose without any treatment.
6	Mula	2012-2013	Along Mula River there is1 Location. Above (ref. table) classification shows that at Paud water is suitable for Irrigation with most crops on most soil.
7	Dam Locations	2012-2013	4 location falls under dam category. Above (ref. table) classification shows that out of 4 locations, at Ujjani dam water is suitable for irrigation purpose. At Khadakwasla dam water is suitable for Irrigation with most crops on most soil and at Panshet and Pavan 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.	2012-2013	5	4	-	6	15



Data Abstract for Pune Sub-division for 2012-13										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station : Ambeghar										
DO	mg/L	6.8	7.4	7.1	7.4	7.6	7.5	7.0	7.4	7.2
BOD	mg/L	1.2	2.3	1.75	1.0	1.8	1.4	2.0	3.3	2.65
COD	mg/L	9.6	16.8	13.2	9.6	10.4	10.0	11.2	16.8	14.0
Total colliforms	MPN/100 ml	23000	220000	121500	22000	35000	28500	27000	46000	36500
Station : Paud										
DO	mg/L	6.4	7.6	7.0	-	6.8	-	6.8	7.2	7.0
BOD	mg/L	1.4	2.1	1.75	-	2.0	-	2.1	5.4	3.75
COD	mg/L	9.6	13.6	11.6	-	12.8	-	13.6	17.6	15.6
Total colliforms	MPN/100 ml	17000	79000	48000	-	33000	-	110000	140000	125000
Station : Khadkawasla										
DO	mg/L	6.4	7.4	6.9	7.0	7.6	7.3	5.6	7.6	6.6
BOD	mg/L	1.0	1.3	1.15	1.1	1.6	1.35	1.3	1.6	1.45
COD	mg/L	7.2	9.6	8.4	8.0	9.6	8.8	8.8	10.4	9.6
Total colliforms	MPN/100 ml	22000	54000	38000	17000	35000	26000	24000	32000	28000
Station : Panshet										
DO	mg/L	6.4	7.6	7.0	7.0	7.2	7.1	7.0	7.2	7.1
BOD	mg/L	1.0	1.2	1.1	1.0	1.2	1.1	1.3	1.4	1.35
COD	mg/L	6.4	8.8	7.6	7.2	9.6	8.4	8.8	9.6	9.2
Total colliforms	MPN/100 ml	2300	24000	13150	13000	35000	24000	17000	28000	22500
Station : Pavana										
DO	mg/L	7.0	7.6	7.3	7.4	7.4	7.4	7.2	7.4	7.3
BOD	mg/L	1.0	1.4	1.2	1.0	1.1	1.05	1.0	1.6	1.3
COD	mg/L	8.0	9.6	8.8	6.4	8.8	7.6	8.0	11.2	9.6
Total colliforms	MPN/100 ml	3300	11000	7150	3300	4900	4100	2300	4600	3450

Data Abstract for Shirur Sub-division for 2012-13										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station : Ambegaon										
DO	mg/L	6.8	6.8	6.8	6.4	6.8	6.6	-	-	-
BOD	mg/L	1.3	2.6	1.95	1.8	2.0	1.9	-	-	-
COD	mg/L	11.2	15.2	13.2	12.8	18.4	15.6	-	-	-
Total colliforms	MPN/100 ml	9200	35000	22100	2300	9400	5850	-	-	-
Station : Chaskaman										
DO	mg/L	6.8	7.0	6.9	6.0	6.4	6.2	-	-	-
BOD	mg/L	1.7	2.6	2.15	2.4	2.6	2.5	-	-	-
COD	mg/L	12.0	15.2	13.6	19.2	20.8	20.0	-	-	-
Total colliforms	MPN/100 ml	33000	70000	51500	13000	79000	46000	-	-	-
Station : Khamgaon										
DO	mg/L	6.2	6.8	6.5	4.6	6.0	5.3	3.0	5.0	4.0
BOD	mg/L	3.5	5.2	4.35	4.6	6.4	5.5	7.2	8.8	8.0
COD	mg/L	16.8	28.8	22.8	15.2	28.8	22	29.6	31.2	30.4
Total colliforms	MPN/100 ml	240000	920000	580000	170000	350000	260000	130000	170000	150000
Station : Rakshewadi										
DO	mg/L	-	6.8	6.8	-	6.4	6.4	-	-	-
BOD	mg/L	-	2.0	2.0	-	3.3	3.3	-	-	-
COD	mg/L	-	14.4	14.4	-	16.8	16.8	-	-	-
Total colliforms	MPN/100 ml	-	27000	27000	-	17000	17000	-	-	-

Data Abstract for Shirur Sub-division for 2012-13										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station : Daund										
DO	mg/L	6.0	6.4	6.2	5.8	6.4	6.1	-	-	-
BOD	mg/L	3.3	4.8	4.05	5.0	5.4	5.2	-	-	-
COD	mg/L	16.8	21.6	19.2	19.2	20.8	20	-	-	-
Total colliforms	MPN/100 ml	23000	350000	176150	130000	350000	240000	-	-	-

Station : Kashti
Note : - Flow of water is not available at Kashti station so sample is not collected in this year.

Station : Nimgaon Gangurde
Note : - Flow of water is not available at Nimgaon Gangurde station so sample is not collected in this year.

Data Abstract for Solapur Sub-division for 2012-13										
Parameter	**Unit**	**Season**								
		Monsoon			Winter			Summer		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Station : Ujjani										
DO	mg/L	6.8	7.4	7.1	5.4	7.0	6.2	6.8	7.4	7.1
BOD	mg/L	3.2	7.2	5.2	4.4	6.0	5.2	6.4	7.2	6.8
COD	mg/L	17.6	30.4	24	17.6	25.6	21.6	24.8	29.6	27.2
Total colliforms	MPN/100 ml	33000	350000	191500	11000	920000	465500	240000	540000	390000

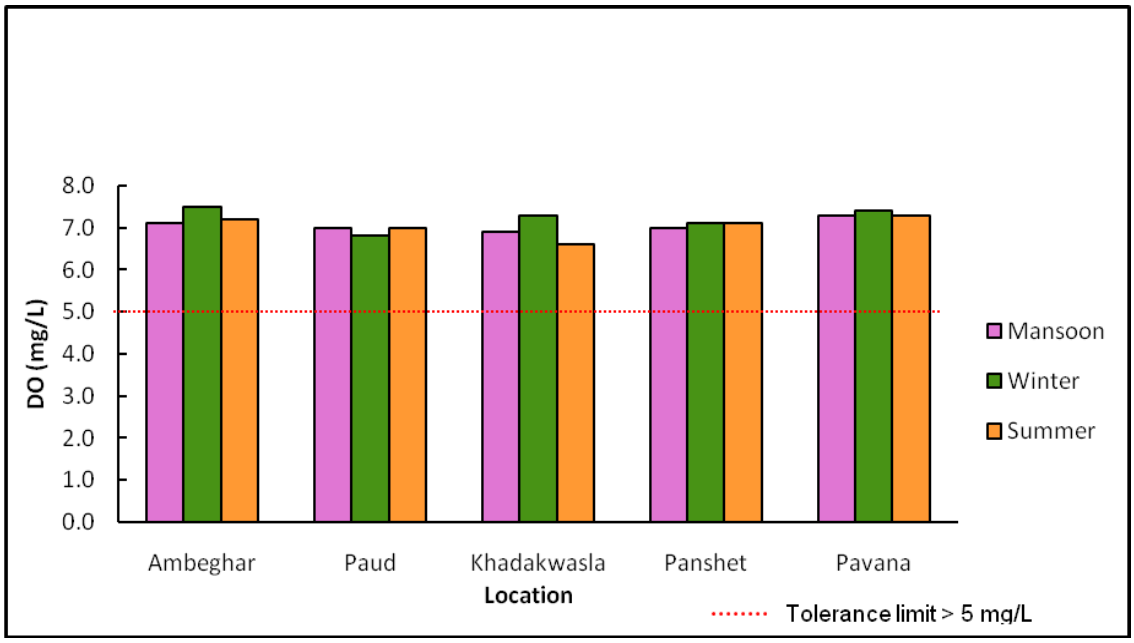
Station : Narsinhpur										
DO	mg/L	6.8	6.8	6.8	-	6.8	6.8	-	-	-
BOD	mg/L	4.6	5.2	4.9	-	5.4	5.4	-	-	-
COD	mg/L	15.2	20.0	17.6	-	16.8	16.8	-	-	-
Total colliforms	MPN/100 ml	22000	28000	25000	-	35000	35000	-	-	-

Station : Sarati
Note : - Flow of water is not available at Sarati station so sample is not collected in this year.

RESULT OBTAINED DURING 2012-13

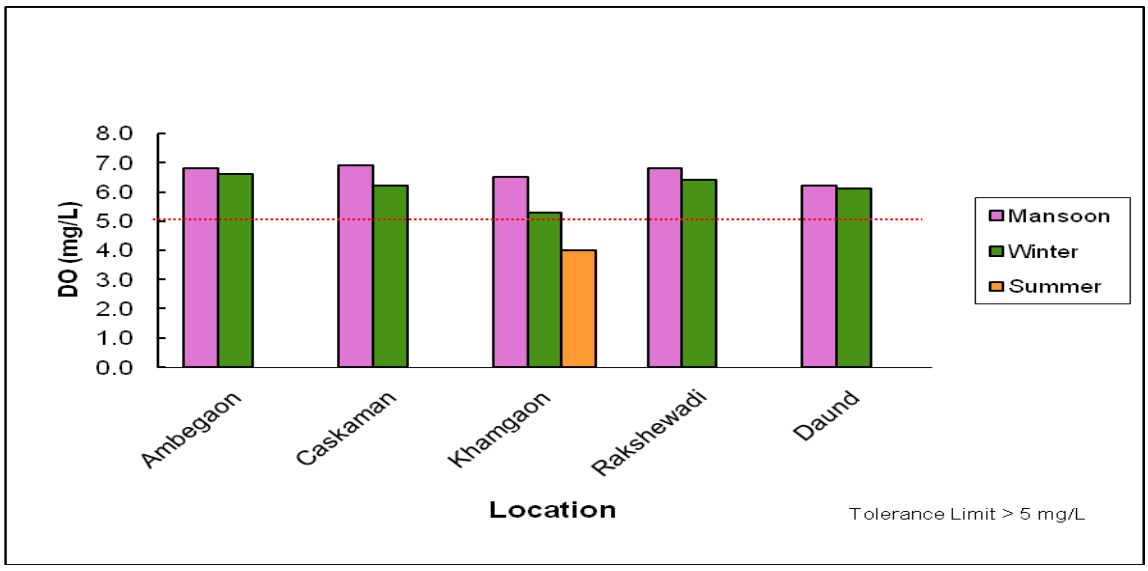
I. Graphical Representation of Dissolved Oxygen:

1. Dissolved Oxygen for Stations under Pune Sub-Division:



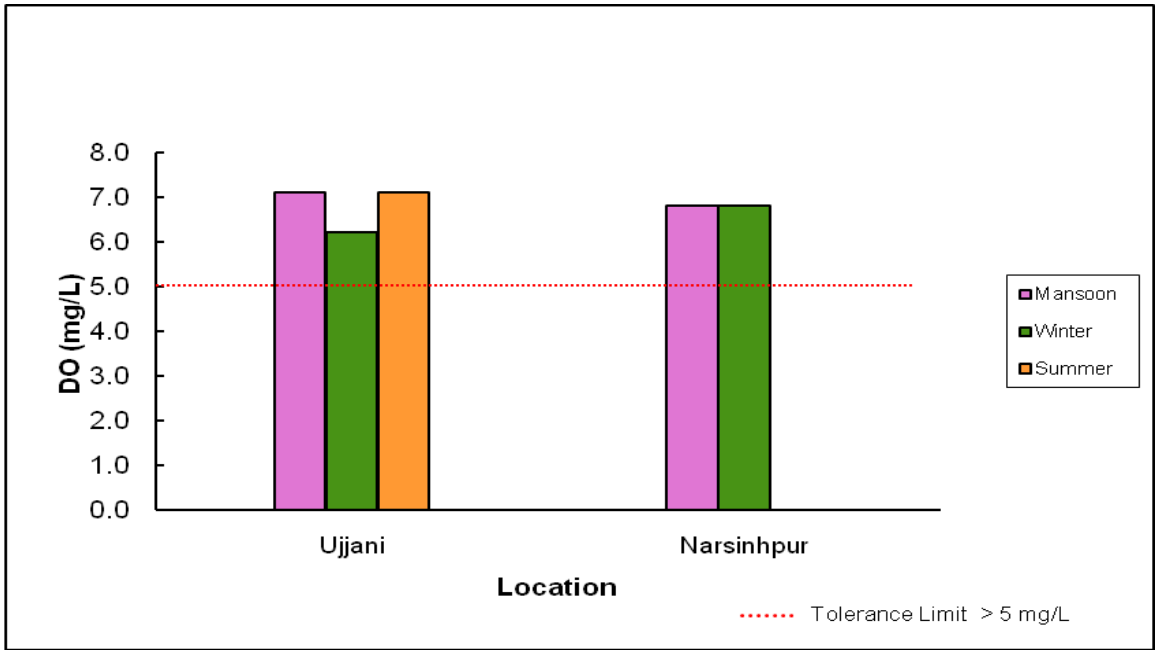
From the above graph, it is being observed that at all stations value of Dissolved Oxygen is within limit.

2. Dissolved Oxygen for Stations under Shirur Sub-Division



From the above graph it is observed that the values of Dissolved Oxygen are within limit at all stations during mansoon & winter seasons except khamgaon in summer.

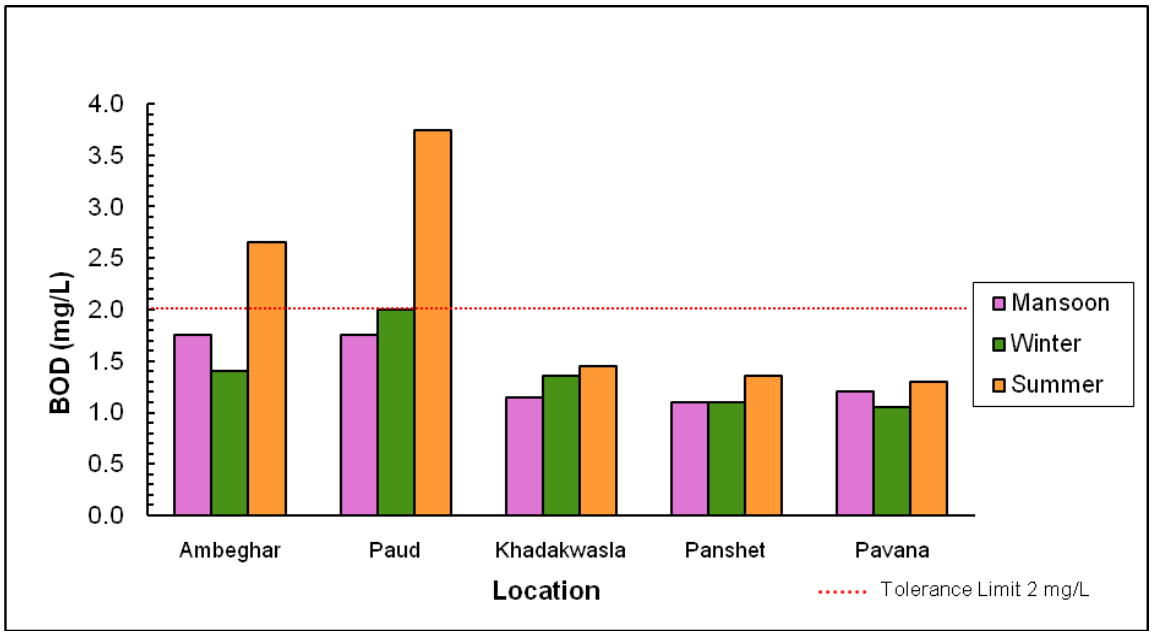
3. Dissolved Oxygen for Stations under Solapur Sub-Division:



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

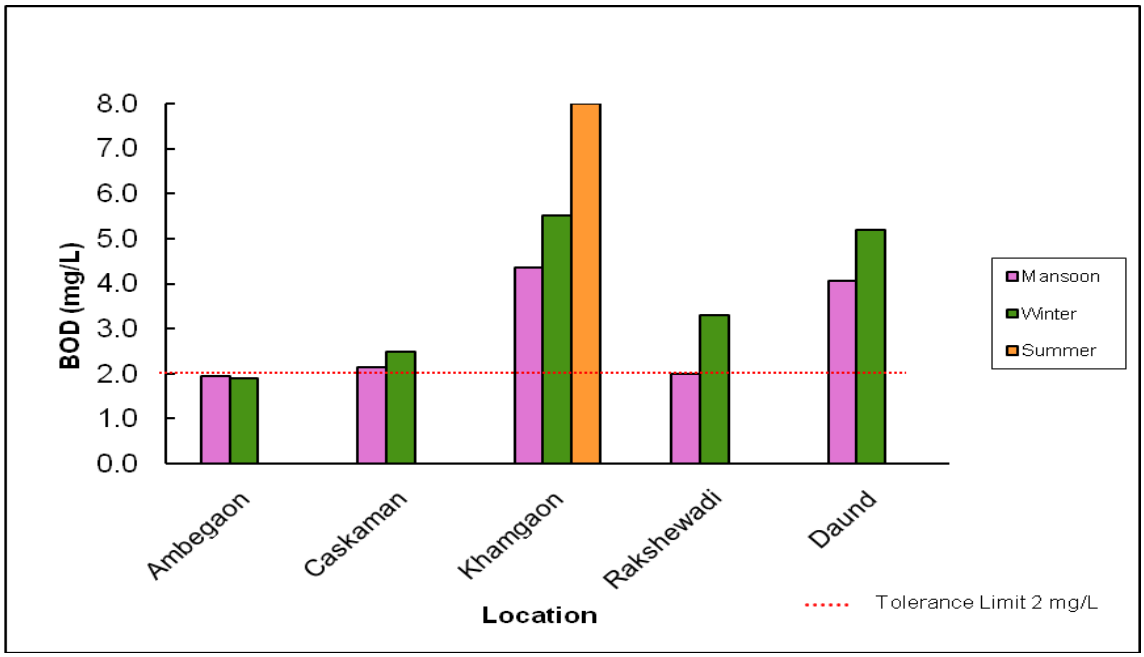
II. Graphical Representation of Biochemical Oxygen Demand:

1. Biochemical Oxygen Demand for Stations under Pune Sub-Division:



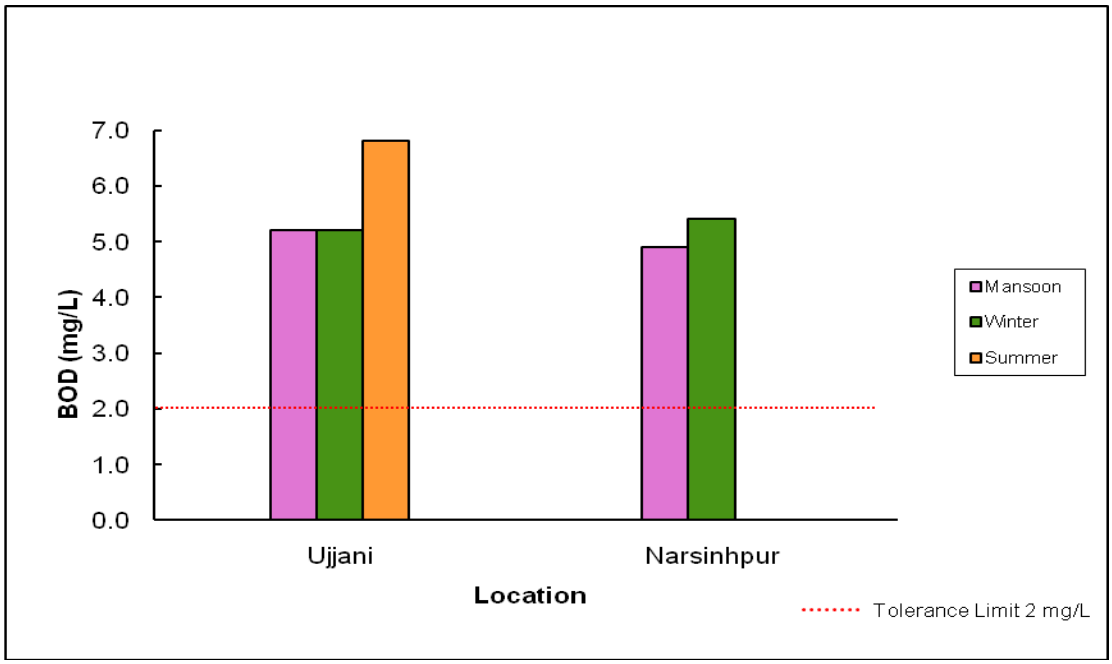
From the above graph it can be observe that, at Ambeghar and paud during summer the values are exceeding the prescribed limit.

2. Biochemical Oxygen Demand for Stations under Shirur Sub-Division:



It is observed that values of B.O.D. are above the limit at Khamgaon, Rakshewadi and daund in all season.

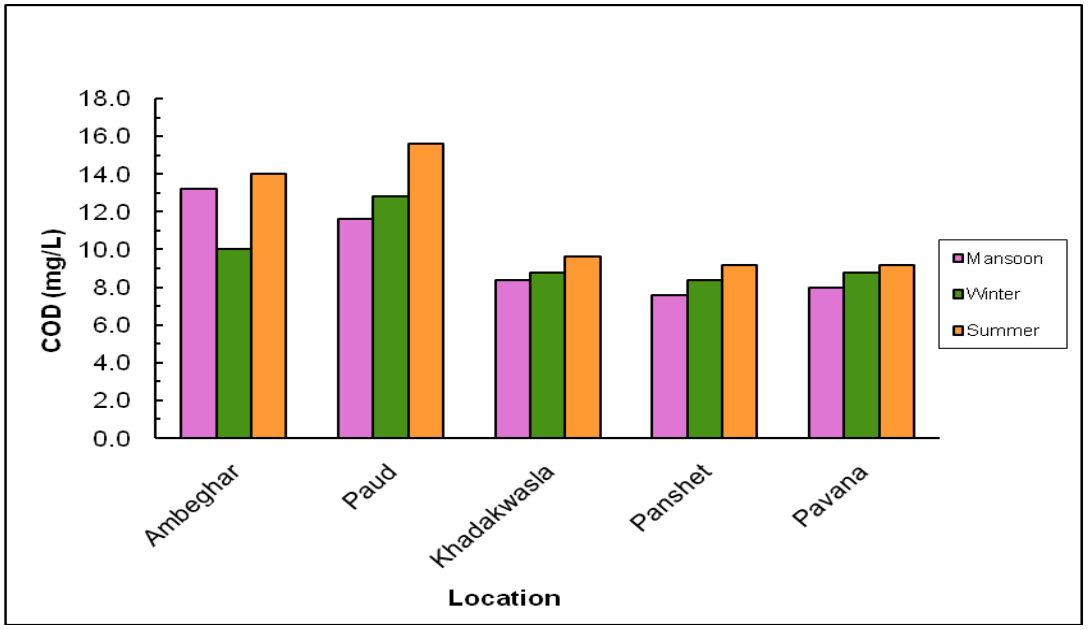
3. Biochemical Oxygen Demand for Stations under Solapur Sub-Division:



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

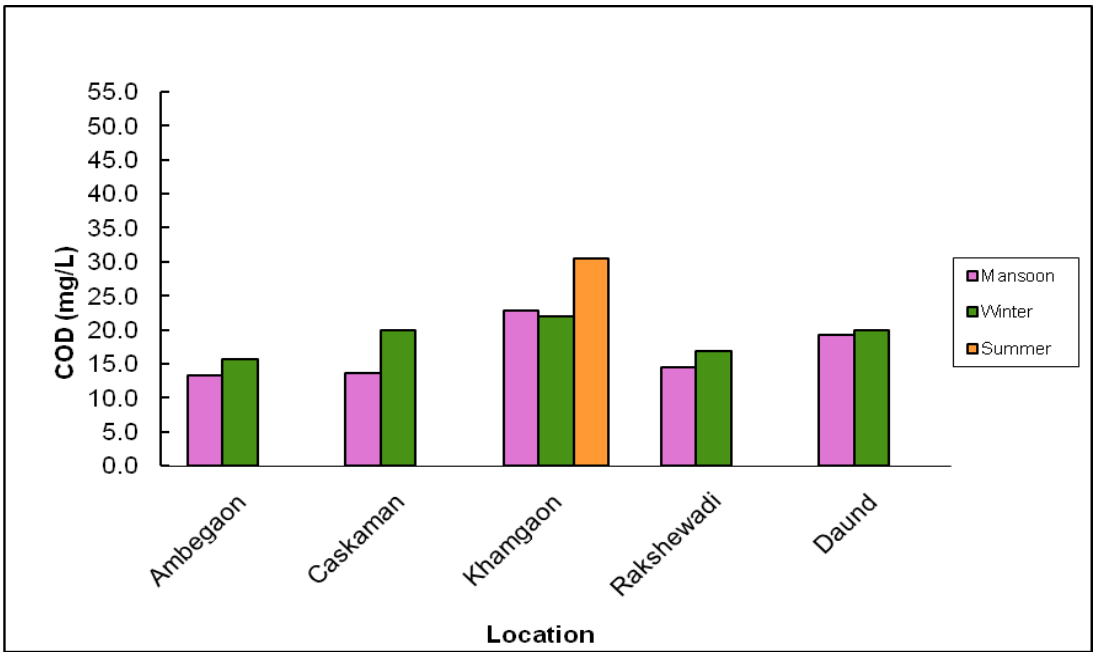
III. Graphical Representation of Chemical Oxygen Demand:

1. Chemical Oxygen Demand for Stations under Pune Sub-Division:



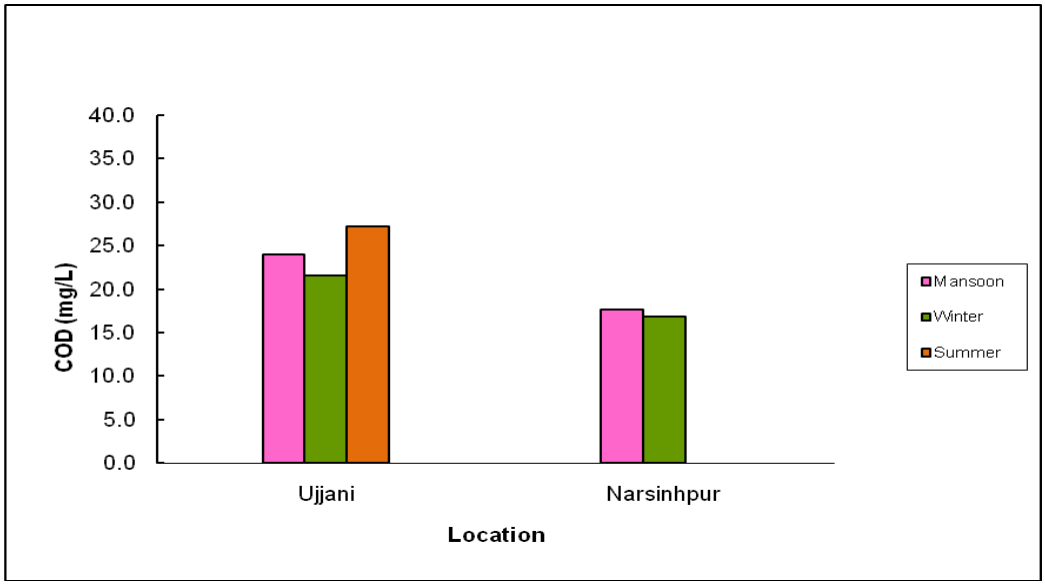
From the above graph it is observed that the value of COD at Ambeghar and paud is higher .

2. Chemical Oxygen Demand for Stations under Shirur Sub-Division :



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

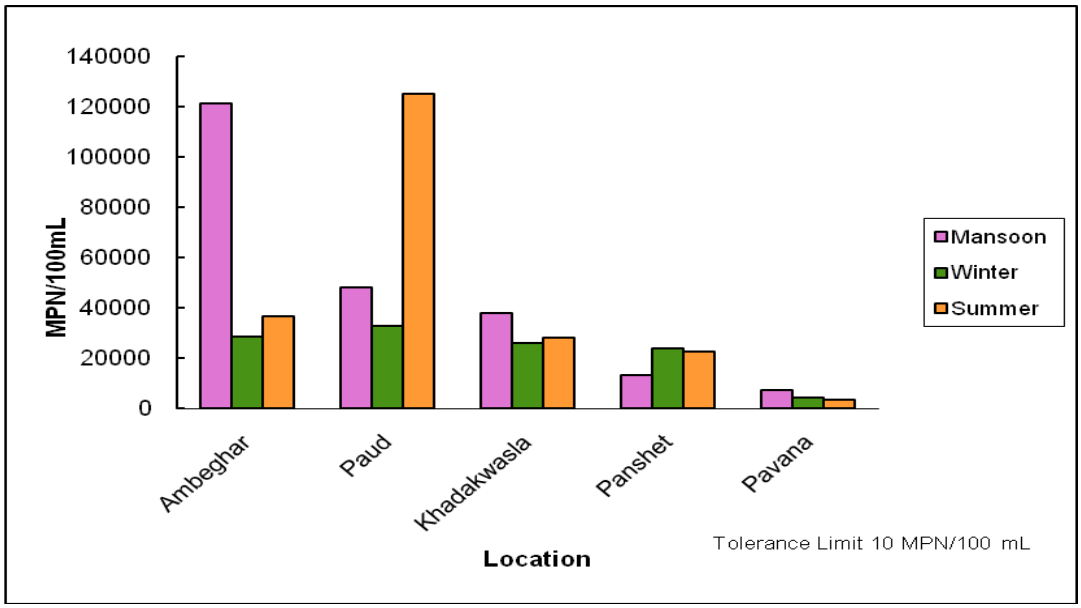
3. Chemical Oxygen Demand for Stations under Solapur Sub-Division:



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

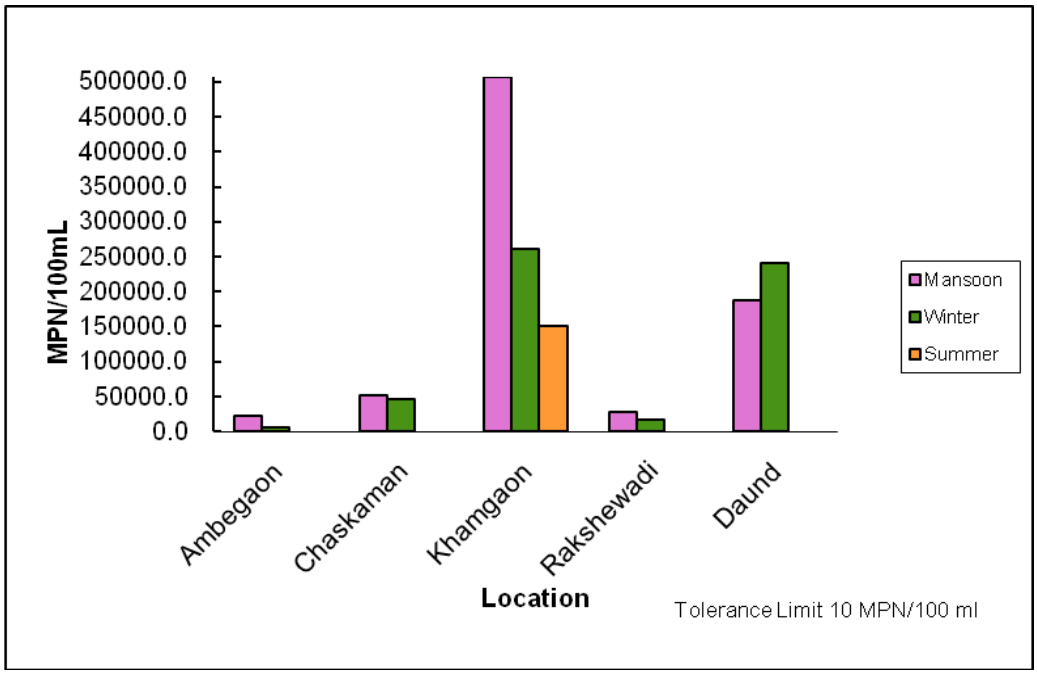
IV. Graphical Representation of Total Coliforms:

1. Total Coliform for Stations under Pune Sub-Division:



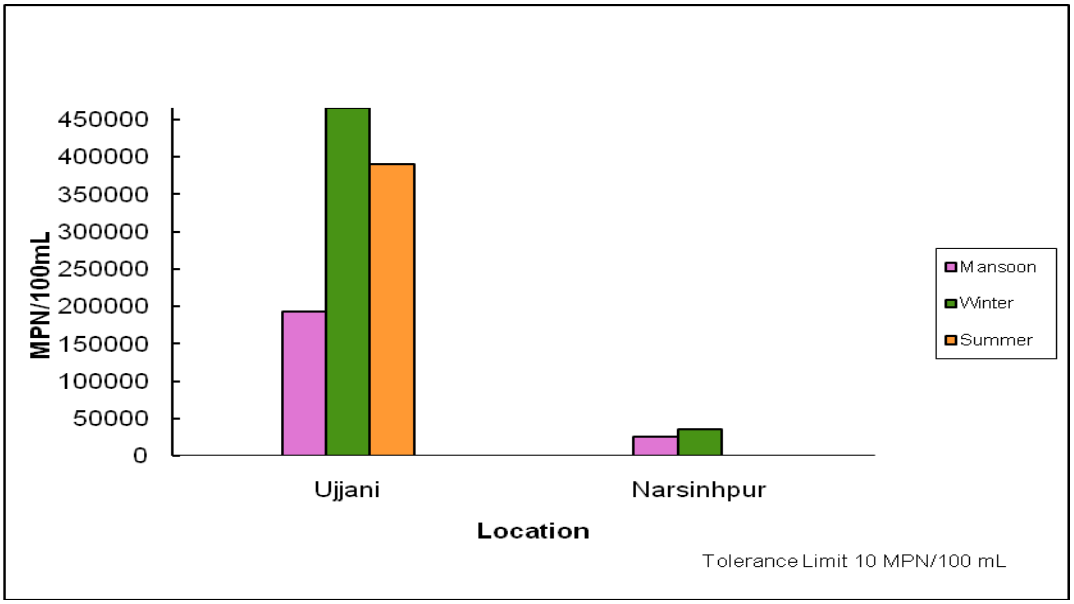
From the above graph it is observed that the value of Total Coli form at all location during all the season is high than the prescribed limit especially much higher at Ambeghar in mansoon and for Paud in summer season.

2. Total Coliform for Stations under Shirur Sub-Division:



From the above graph it is observed that the value of Total Coli form at each location during all the season is high than the prescribed limit especially at Khamgon and Daund .

3. Total Coliform for Stations under 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.

Chapter V
CONCLUSION

CHAPTER - 5

CONCLUSION

5.1 Conclusion

Observing all the factors it can be concluded that, analysis results from all the locations have shown increase in value of Biological Oxygen Demand and Total Coli form as compare to previous year. 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 Daund, Khamgaon and Ujjani location most 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 2012-2013 many clients approached the laboratory. The clients availed the facility of the laboratory are as below;

1) Lonavala Municipal Corporation
2) Central water Commission Pune
3) Fiat India Automobiles Ltd. Pune.
4) Range Forest Officer (Research) Pune
5) Irrigation Research Sub-division, Khed, Ratnagiri.
6) Technogreen Environmental Solutions Pune

6.2 REVENUE GENERATED DURING THE PERIOD

Sr. No.	Year	Amount Received
1.	2012-2013	79,142

6.3 ISO Certification:

Renewal audit of ISO 9001:2008 was successfully completed in November 2012, lab has been certified for next 3 years.

CHAPTER VII
ANNEXURE

Annual Report on

Water Quality Monitoring through Water Quality Lab Level-II, Pune for the Year 2012- 2013

ANNEXURE

List of Client 2012-2013

Sr. No.	Name of Client	Purpose of Analysis
1	Central Water Commission Upper Krishna Division Khadakwasla	Drinking Purpose
2	Irrigation Research Sub-division, Khed, Ratnagiri	Drinking Purpose
3	Gangakunj co-operative Hsg. Soc. Ltd. Pune	Drinking Purpose
4	Mr. Navnath Kumbhar , Lohegaon, Pune	Drinking Purpose
5	Fiat India Automobiles Ltd. Pune	Drinking Purpose
6	Lonavala Municipal Council	Domestic Effluent
7	Mr. Rajendra Joshi , Pune	Drinking Purpose
8	Mrs. Ashlesha D. Gholap , Pune	Drinking Purpose
9	Mr. Arun Kumar Deedwania, Pune	Drinking Purpose
10	M/S Vijay Builders , Pune	Drinking Purpose
11	Mr. Onkar Joshi , Dhanori, Pune	Drinking Purpose
12	Mr. Premnath Thakur , Pune	Drinking Purpose
13	Mr. Chandrakant Jadhav , Pune	Drinking Purpose
14	Range Forest Officer (Research) Pune	Drinking Purpose
15	Panama Sunarch Developers Pune	Drinking Purpose
16	Deputy Director Sports & Youth Services , Pune	Drinking Purpose
17	Mr. Rajesh Chavan , Pune	Drinking Purpose
18	Technogreen Environmental Solutions, Pune	Domestic & Industrial Effluent
19	Patel constructions , Pune	Drinking Purpose
20	Mr. Sachin Gore , Pune	Industrial Effluent
21	Lokmat Media Pvt. Ltd., Pune	Drinking Purpose
22	M/S Quadron Business Park	Industrial Effluent
23	M/S Siemens India Pvt. Ltd.	Industrial Effluent
24	Ujjani Dam Mgmt. Division , Bhimanagar	Drinking Purpose

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 NABCB

Member of IAF MLA for QMS

NABCB QM 006

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, Maharashtra, India

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 Organization to the above Standard, which will be monitored by IRQS

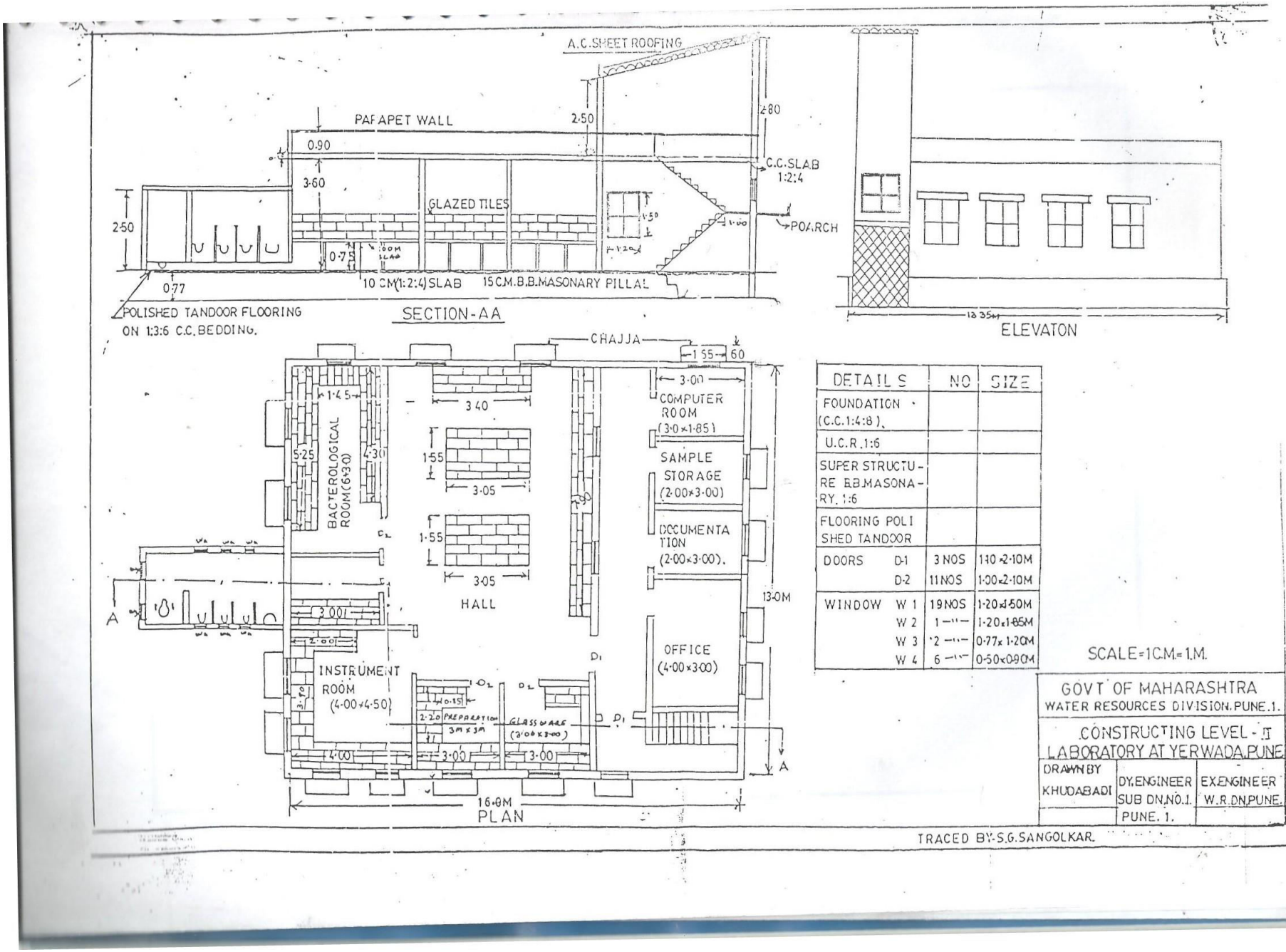
Certificate No.: *IRQS/1210635* granted on: 12th December 2012

Initial Approval Date: 9th February 2010
Current Certification Effective Date: 9th February 2013
Current Certificate Expiry: 8th February 2016

C. Sriramamurthy
Chief Surveyor & Senior Vice President

The use of the Accreditation Mark indicates accreditation with respect to activities covered by the certificate with accreditation no. QM 006

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

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. PUNE. 1.	W.R.DN.PUNE.

PHOTOGRAPHS

Visit by Executive Engineer, Hydrology Project Division Pune

Visit by Superintending Engineer, Hydrology Circle, Nashik on 26/04/2013

Visit by S. K. Kshirsagar, Sectional Engineer, Hydrology Project Circle, Nashik on 14/02/2013.

Renewal Audit of ISO 9001:2008 30/11/2012 by IRQS

Jurisdiction Map of Laboratory