

COMPARATIVE REVIEW OF WATER POLLUTION OF PAWANA RIVER

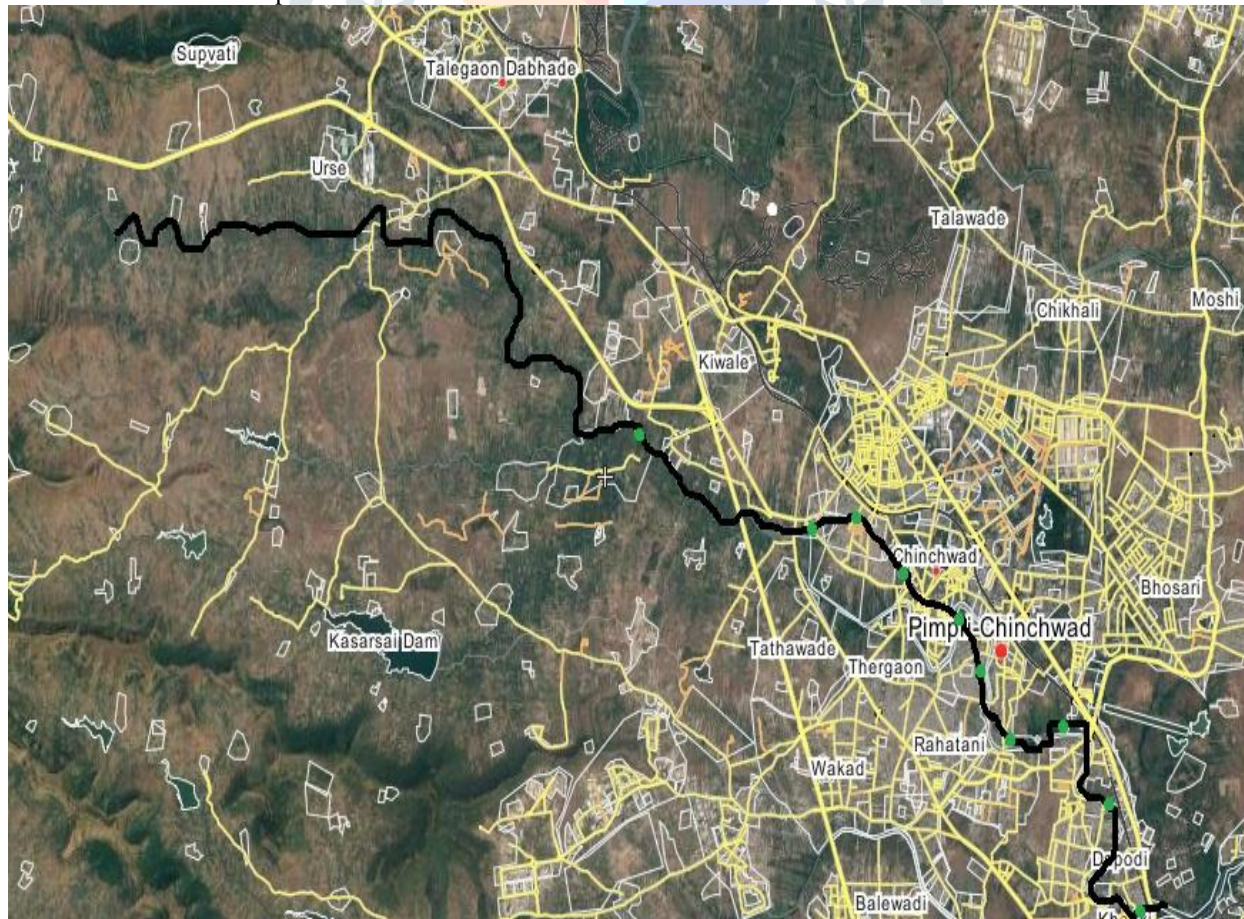
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ABSTRACT-Pune , one of the metropolitan city of India , with population approximately 70 lacs .The city has two municipal corporations Pune Municipal Corporation (PMC) and PimpriChinchwad Municipal Corporation (PCMC) . Pune and PimpriChinchwad are the twin cities and well connected by rail and most popular as industrial, educational and auto hub of our country. The Pawana river originates in western ghats near Lonawala flowing towards south-East and flows through PimpriChinchwad city covering a stretch of 24 Km . Since the population of the city is increasing rapidly , it results in increase in domestic and other type of waste and it becomes a source of water pollution . The present study deals with the review of comparison of major physio-chemical parameters like DO , BOD and COD . The sample of river water collected for a period of three months May 2016, August 2016 and January 2017 and the analysis is done .

Key words :---physio-chemical, Pawana river

INTRODUCTION

We always say "water is life " but nobody wants to do any activity which preserves the water . Wasting of water is become a part of lifestyle . Water is used for various purposes by public . The water is used in large quantity by city water supply, industrial sectors , and other similar agencies . The used water appears as a waste water . It may be treated before its final disposal . But because of loose legislations in our country at some sites the untreated effluent is directly discharged into the nearby water bodies or river which pollutes the river water . The same thing is happening with Pawana river . The Pawana river flows through PimpriChinchwad city and only source of city water supply as well as industrial water supply . The river enters in the city at village ravet . The increase in population , rapid industrialization , modernization affects the quality of river water . Various researchers have been conducted study on quality of Pawana river water . The causes of water pollution is industrial effluents , disposal of untreated waste directly in the water , illegal activities done by the citizens etc . The slum area along the bank of the river is also major cause of pollution . The river water pollution actually starts from the downstream of the ravet village upto its confluence in Mula river at Dapodi .



Map of Pawana river and sampling locations .

LITERATURE REVIEW

A physicochemical monitoring review of Pawana river was carried out by MrLakhanpalKendre Prof .SagarGawande in the year 2017and reviewed that the Chinchwadgaon and kalewadi sites are the most polluted because of industrial discharges .Sources of waste water from industries and residential areas washing of clothes ,animals,dumping of garbage was also observed on these sites .

An analytical study of heavy metals in Pawana river and its effects on aquatic culture is studied by Ashwini Jamdade¹ and Prof .Sagar Gawande² in the year 2017 .They have selected five sites along the course of river .The analysis was carried out for pH ,Temperature , COD , BOD . DO, TS, Turbidity and heavy metals .They found in many places the continuous discharge of industrial effluents and sewage are being discharged into the rivers contributes considerable pollution in the river and which exceeds the limits of environment .

Studies on water pollution of Mula ,Mutha and Pawana rivers in summer season in the Pune city region was carried out by VinayaFadtare and T .T . mane in the year2006 . The analysis was carried out for pH , BOD ,DO, hardness ,calcium ,magnesium, sodium ,potassium,nitrates and nitrites .The analysis depicted heavy pollution of the river water as BOD was high with lower or absence of DO at some sites .The nitrates ,nitrites ,sulphatesphosphates and sodium shows high value at some highly polluted sites .and concluded that the rivers were unpolluted at the point where they enter the city ,but progressively polluted due to the discharge of effluents from industries and city sewage .As a result there is a gradual deterioration of water quality .

Nidhi Jain and R.K. Shivastav studied “Comparative Review of Physicochemical Assessment of Pavana River” The study was aimed to review the status of physicochemical characteristics of Pavana River, Pune. Comparative study of data of water quality has been studied from 2005 to 2013 and the physicochemical parameters such as pH, DO, COD, BOD, etc. has been compared. It was found that at many places the water is highly polluted. There was an increase in DO and decrease in COD, BOD contents in the water. For the statistical analysis, values of mean, standard deviations and correlation were also calculated for the water quality characteristics.

MVS Vaishnavistudied “Study of levels of heavy metals in the river waters of regions in and around Pune City, Maharashtra, India” Heavy metal contamination of the MulaMutha and Pavana Rivers of Pune city during the month of January2015 was assessed through quantitative analysis. The samples were analyzed for different heavy metals(Cd, Co, Cr, Cu, Ni, Pb and Zn). This study was conducted to determine the quality of run-off water which is used for drinking in the study area.

Patil. P.N studied “Physio-chemical parameters for testing of water” People on globe are under tremendous threat due to undesired changes in the physical, chemical and biological characteristics of air, water and soil. Due to increased human population, industrialization, use of fertilizers and man-made activity water is highly polluted with different harmful contaminants. Natural water contaminates due to weathering of rocks and leaching of soils, mining processing etc. It is necessary that the quality of drinking water should be checked at regular time interval, because due to use of contaminated drinking water, human population suffers from varied of water borne diseases. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. It is necessary to know details about different physico-chemical parameters such as color, temperature, acidity, hardness, pH, sulphate, chloride, DO, BOD, COD, alkalinity used for testing of water quality. Heavy metals such as Pb, Cr, Fe, Hg etc. are of special concern because they produce water or chronic poisoning in aquatic animals. Some water analysis reports with physic-chemical parameters have been given for the exploring parameter study. Guidelines of different physic-chemical parameters also have been given for comparing the value of real water sample.

ChandanshiveNavnathEknath studied “The Seasonal Fluctuation of Physico-Chemical parameters of River Mula- Mutha at Pune, India and their Impact on Fish Biodiversity” The paper highlights pollution status and impact on fish diversity in Mula-Mutha River and dams on it. However, it has been observed that fish diversity is gradually decreasing since last thirty years , mainly due to manifold human activity. Fish diversity in midway of river is becoming rare and only four species have been reported form polluted stretch of river The Mula-Mutha River and its tributaries are highly polluted due to domestic and industrial wastes.. It is observed that the level of these parameters was optimum during and winter and summer seasons.. A total of nine water samples were collected from the river sites. The samples were analyzed for their pH, electrical conductivity, total dissolved solids and different trace metal contents. The mean concentrations of Cd and Pb obtained were respectively 0.039 and 0.107 mg/L which were higher than the permissible limits declared by World Health Organization (WHO), while mean nickel concentration was slightly at higher end than the permissible limit of WHO. Results showed the presence of Cd, Ni, Pb and Cu in the water samples.

The number of polluters creating pollution to the river water goes on increasing .The peoples are using the water for cloth washing , animal washing , vehicle washing which leads to contamination of water .The surface water and river water becomes used as a dumping site for industrial effluent and domestic purposes . Due to this the ecological balance of river gets disturbed .The change in water quality parameters leads the gradual deterioration of water .At some sites the untreated waste is directly discharged in the water .The investigation shows that

the pollution level is maximum in summer season since the flow is less.

The study is aimed to know the variation in characteristics Pawana river water .The study was done by PimpriChinchwad Municipal Corporation Pimpri Pune .For this study the samples were collected from 10 sample locations as shown on the map .The location were 1.Near Kiwale village 2.Ravet bandhara 3.Walhekarwadi4. Near aditya Birla Hospital 5.Near MoryaGosavimandirChinchwadgaon 6.Thergao Funeral home7. Near new bridge Pimpri 8Kalewadi funeral home 9 Near shiv mandir Pimple Sudagar 10.Harris bridge Dapodi

The readingsobtained aresummarized in the table No 01 and the comparison is done graphically

Table No 01

| SR NO | Location | Duration | DO(mg/lit) | BOD (mg/lit) | COD(mg/lit) |
|------------|---|-------------|------------|--------------|--------------|
| MPCB Norms | | | >2 mg/lit | < 30 mg/lit | < 150 mg/lit |
| 01 | S1 Near KiwaleGaon | May2016 | 3 | 11.2 | 26 |
| | | August2016 | 6.7 | 3 | 12 |
| | | January2017 | 4 | 4 | 10.2 |
| 02 | S2 Ravetbandhara | May2016 | 2.9 | 13.5 | 32 |
| | | August2016 | 5 | 4 | 21 |
| | | January2017 | 4 | 9 | 24 |
| 03 | S3 Walhekarwadi | May2016 | 3 | 13.9 | 32 |
| | | August2016 | 4.4 | 3 | 12 |
| | | January2017 | 3 | 6 | 14 |
| 04 | S4 Near aditya Birla Hospital | May2016 | 1.8 | 23.3 | 57 |
| | | August2016 | 5.28 | 5 | 30 |
| | | January2017 | 2.5 | 7 | 36 |
| 05 | S5 Near MoryaGosavimandir Chinchwadgaon | May2016 | 2.2 | 20.4 | 50.4 |
| | | August2016 | 4.8 | 3.0 | 12 |
| | | January2017 | 3.7 | 11 | 16 |
| 06 | S6 Thergaon Funeral home | May2016 | 5.6 | 10 | 57 |
| | | August2016 | 4.8 | 3.0 | 12 |
| | | January2017 | 1.2 | 18 | 32 |
| 07 | S7 Near new bridge Pimpri | May2016 | 2.4 | 36.5 | 89.6 |
| | | August2016 | 4.7 | 14 | 62 |
| | | January2017 | 2.5 | 28 | 76 |
| 08 | S8 Kalewadi funeral home | May2016 | 2.1 | 44.4 | 74.1 |
| | | August2016 | 4.9 | 6.0 | 24 |
| | | January2017 | 2.6 | 32 | 38 |
| 09 | S9 Near shiv mandir Pimple Sudagar | May2016 | 1.1 | 44.8 | 15.2 |
| | | August2016 | 4.8 | 15 | 98 |
| | | January2017 | 2.5 | 40 | 109.7 |
| 10 | S10 Harris bridge Dapodi | May2016 | 0.0 | 28 | 91 |
| | | August2016 | 6.13 | 10 | 36 |
| | | January2017 | 2.1 | 26 | 65 |

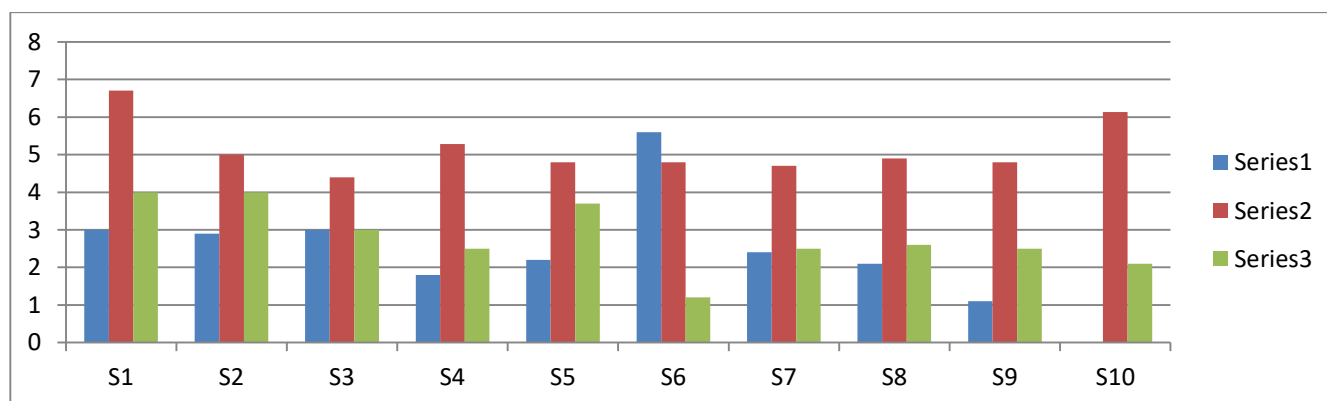


Fig1 Comparison of DO at various locations

Near Kiwalegaon the water is of good quality .The value is decreased near Aditya Birla hospital it may be due to the mixing of Padamji Paper mill waste on the u/s side of Birla Hospital and there is gradual reduction in DO from d/s side of Pimrigaon and absolutely 0.0 at harris bridge Dapodi due to the confluence of Pawana river in Mula River The samples are taken in hot season .when the samples are taken in rainy season i.e in the month of Aug the value of DO is improved very much due to dilution of flood water .Again when the samples are taken in dry season the values are go on decreasing .

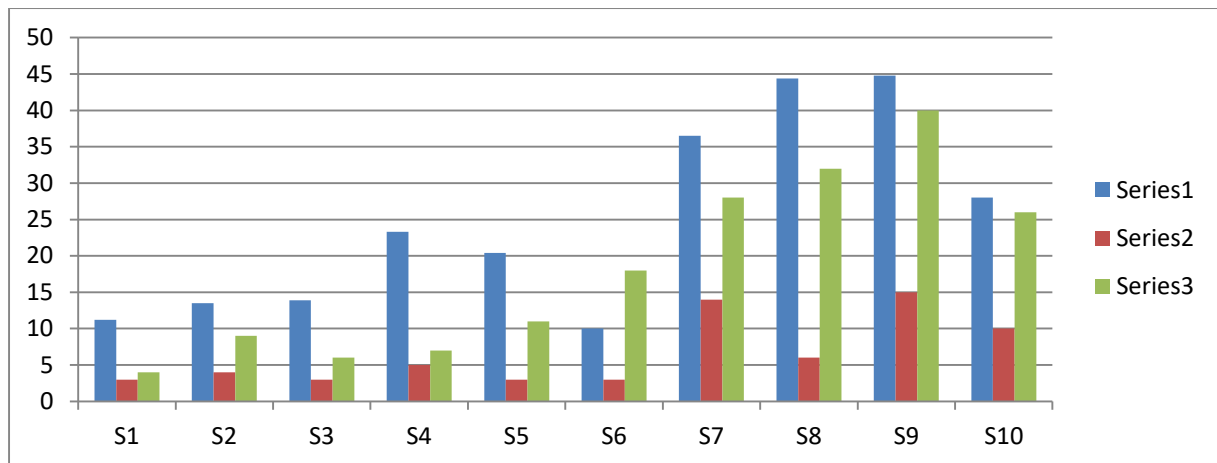


Fig2. Comparison of BOD at various locations

By observing the graph it is clear that the values of BOD are fair upto Thergaon funeral home but from onwards the values are beyond the limit and reaches the maximum upto 45 when the river passes through the slum areas on both the banks of river in Pimpri and the mixing of effluent of sewage treatment plant Kasarwadi .

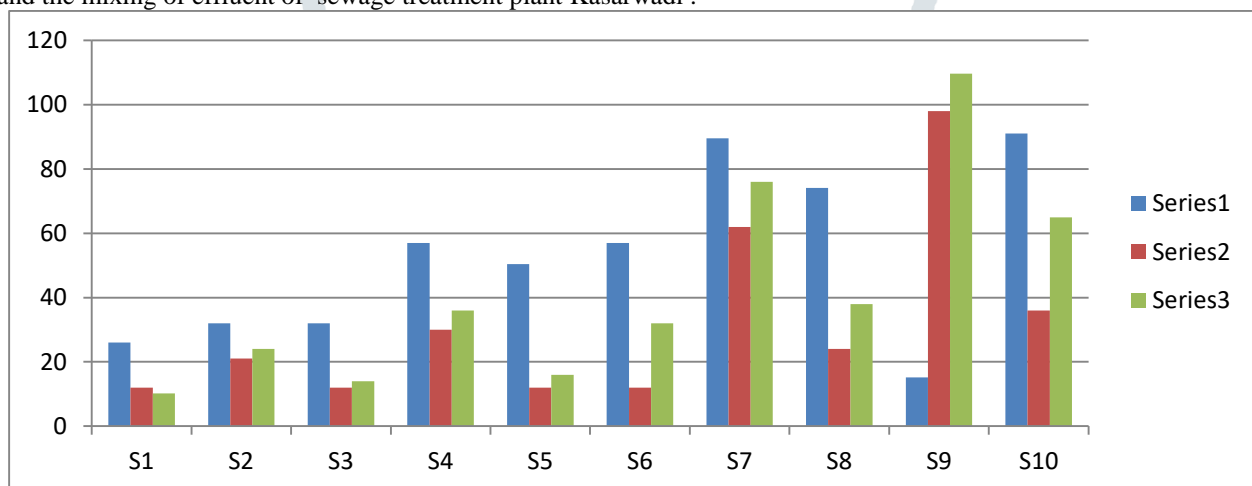


Fig3. Comparison of COD at various locations

The values of COD are found quiet fair at walhekarwadi but the values are still go on increasing from Pimpri and reaches maximum upto 109.7 at Pimple Soudagar .It may be result mixing of industrial effluents of small scale industries located on the downstream side of Pimpri .

CONCLUSION :- The samples were collected in the month of May2016, August2016 and January2017.All the samples were tested by using APHA method .PimpriChinchwad is a major industrial hub of Asia .This town serves a major automobile industry ,several companies and manufacturing processes , leading to environmental pollution .Increasing water pollution is a major problem for Pawana river .Contaminated water is the biggest risk which affect on living environment .From the above comparative review it can be concluded that when the river enter in the urban body the pollution starts. From Kiwale village the river is entering into PimpriChinchwad city and the water quality characteristic are changing gradually .The sites S7 and S9 are showing considerable value of BOD and COD while the site S9 and S10 hows very poor values of DO.The water quality characteristic are improving in rainy season due to the dilution of flood water ,but the values are very poor in dry season . River water quality is deteriorated mainly due to the mixing of domestic waste water and industrial effluent .Day by day the pollution load is increasing .It is recommended to assess the quality of water frequently .

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