



WATER QUALITY ASSESSMENT OF ADOL DAM, WASHIM (MS) INDIA

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Abstract: Fresh water resources like dams, reservoirs, lakes, streams, rivers etc. are chiefly used for drinking, irrigation, industrial and domestic purposes. The Adol reservoir is one of the fresh water resources present in the Washim district. It provides water for drinking and irrigation purpose to many villages and also good source of fishery. The present study is a primary attempt to evaluate the water quality of Adol reservoir. For the evaluation of water health, some of the physical and chemical parameters were analyzed for the period of five months (August to December 2018). The results of present study show that all parameters were in the standard range as mentioned by WHO (World Health Organization). For the sustainability of the reservoir it is advised that the water wasted in irrigation should be avoided.

Keywords: Adol, Dam, reservoirs, Washim, Water quality.

Introduction:

In the recent years environmental monitoring through regular assessment of water quality has become a factor in the exploitation or conservation of aquatic resources. Water is the most vital abiotic component and is unique in many respects. In precipitation it becomes a mixture and acts as abiotic component of aquatic ecosystems. Water quality thus at a given time and space acts as a limiting factor that, in turn, regulate biotic diversity and biomass, energy, material cycle, trophic levels and rate of succession. A water quality assessment generally involves analysis of physicochemical, biological and morphological parameter and reflects on abiotic and biotic status of the ecosystem. This, in turn, helps in planning exploitation, antipollution or conservation strategies. Further, due to their open nature a constant exchange of matter and energy goes on between ecosystems and its surroundings thus making water quality a dynamic entity. That is why water quality assessment is a continuous process undertaken on a regular basis. Natural water is extremely varied in chemical composition and factors controlling the composition include physical, chemical and processes **Kedar et al.(2008)**. Assessment influences the pollution and overall conservation of ecosystem. It shows anomalous behavior due to the presence maximum organic and inorganic compounds in it **Dohare et al. (2014)**.

Various researchers studied the physicochemical properties of water and the seasonal variation in physicochemical parameters was checked by **Muniyan *et al.*(2011)**. The physico-chemical parameters of water were also analyzed by **Patil *et al.*(2012)**.The Physico-chemical analysis of surface and ground water was investigated by **Mahanandaet *al.*(2010)**,at Baragrah district Orissa, India Kalra.The parameters studied by **Meiteiet *al.*(2004)**that shows pollution trend increases due to discharge of sewage and anthropogenic activities. The analysis of physico-chemical parameters of the Nkam river for establishing the diagnosis of its water was done by**Togueet *al.*(2017)**.

MATERIALS AND METHODS

The study was conducted on the Adol Dam from four sampling sites, these were S1, S2, S3 and S4 for the analyzed these parameters such as Colour, Temperature, pH, TDS, EC, DO, CO₂, CO₃, HCO₃, Salinity, Chloride, Total Hardness, Calcium Hardness all the parameters analyzed by using standard method of**Clesceriet *al.*(1998, 2006, 2008)**in APHA.

Adol Dam:

It is an earth-fill dam on Adol River near Borala in the Washim district. The opening year of the dam was 1990. It was constructed by the Government of India. Its co-ordinates are 20.0992868° N and 76.9798279° E. The height of the dam from the lowest foundation is 18.47m (60.6ft) while the length is 1,725m (5,659ft). The volume content is 479km³ (115cu mi) and gross storage capacity is 15,270.00km³(3,663.47 cu mi). The water of the dam is used for irrigation as well as drinking purposes.



Result and Discussion:

In the present study, physico-chemical parameters of Adol Dam in Washim district of Maharashtra were analyzed. The mean with standard deviation values of all physico-chemical parameters of water sample were collected from sampling sites S1, S2, S3 and S4 are presented in table I.

Physicochemical parameters	Mean and Standard Deviation
pH	7.5±0
Temperature	25.75±0.37
Electrical Conductivity	190.37±0.24
TDS	172.37±0.92
Dissolved Oxygen (DO)	4.38±0.61
Free Carbon Dioxide (CO ₂)	Absent
Carbonate (CO ₃)	203±19.55
Bicarbonate (HCO ₃)	156.3±10.74
Total Hardness	263.6±73.24
Calcium Hardness	111.51±0.43
Magnesium Hardness	189.81±12.95
Chloride	91.344±10.19
Salinity	167.03±17.72

Colour: Coloration is a unique property of lake water on which we can determine the status and quality as well as roughly predicted the phytoplankton and zooplankton density of that lake. Adol Dam water not appears variable colour throughout the study period.

pH: pH is indispensable physical parameter as most of biological process and biochemical reactions are pH dependent. pH is most indispensable in determining the corrosive nature of water, lower the pH value, higher is the corrosive nature of water. The pH value is recorded 8.25±6.92 which was maximum in five months seasonal variations. The seasonal changes in pH of Adol Dam are shown in table I.

Temperature: Temperature of the water is important for its effect on the chemistry and biochemical reaction in the organisms. It is essential factor in the aerobic environments of aquatic system, as it determines the succession of pre-dominant of algae bacteria and other aquatic organisms. In the present investigation the maximum temperature was observed at Adol Dam 26.816±25.184. Similar values were recorded by **Soniet *al.* (2016)**.

Electrical Conductivity: Electrical conductivity (EC) is a measure of the electric current that a solution carry. Electrical conductivity is used to quickly estimate the ionic or soluble salt concentration in soils, water supplies, fertilizer solution and chemical solution. In the present investigation the maximum conductivity was observed in Adol Dam 191.20±189.29.

TDS:Total Dissolved Solids denotes mainly the various kinds of minerals present in the water. Dissolved solids are indispensable parameter in drinking water. In the present study the maximum TDS was observed in Adol Dam 173.95 ± 170.54 .

Dissolved oxygen:The maximum value of Dissolved oxygen was found 5.095 ± 4.905 . The maximum and minimum value of Dissolved oxygen was found in the month of August and December respectively. The result of this present study was found similar with the result of **Bali et al. (2016)**.

CO₃ (Carbonate phenolphthalein alkalinity):The maximum value of Carbonate was found in month of October (243.14 ± 195.85) and the minimum value of Carbonate was found in December (194.14 ± 144.08).

Bicarbonate: During the present study the bicarbonate was observed lowest at Adol Dam (150.91 ± 144.08) in December while the highest average value was observed (178.82 ± 171.17) in October.

Chloride: Chloride anions are abundantly present in waste water. The maximum (120.29 ± 88.85) and minimum (20.495 ± 15.645) value of chloride was observed in the month of November and October respectively.

Salinity:The maximum value of salinity was found in the month of November 217.22 ± 160.34 and the minimum value was found to be in the month of December 151.20 ± 130.34 .

Total hardness:During the present analysis the maximum value of total hardness of Adol Dam was found to be 316.32 ± 283.67 mg/l. The maximum value of hardness was found to be in month of August and the minimum value 138.29 ± 127.70 of hardness was found in the month of August. The current study was supported by **Kamble et al. (2009)** at Ruti Dam Ashti, Dist. Beed.

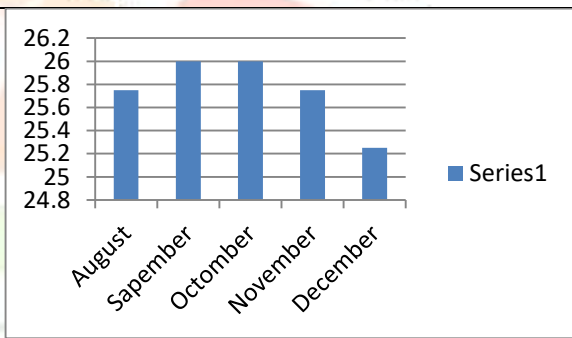
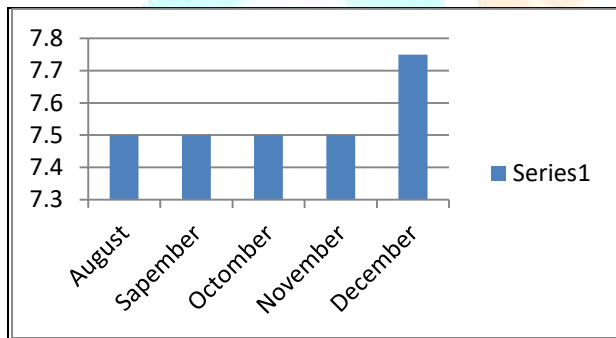
Calcium hardness:The same value of calcium hardness of Adol Dam was found to be in the month of October and November 112.29 ± 111.64 while the lowest value was found to be in the month of December 111.70 ± 109.79 .

Magnesium:The magnesium is also an important parameter of water which shows the water quality. The minimum and maximum value of magnesium was found to be 206.42 ± 172.11 and 26.54 ± 15.49 respectively. The present study was supported with **Mohamed (2005)**, at ABUZa' Baal ponds, Egypt.

Conclusion

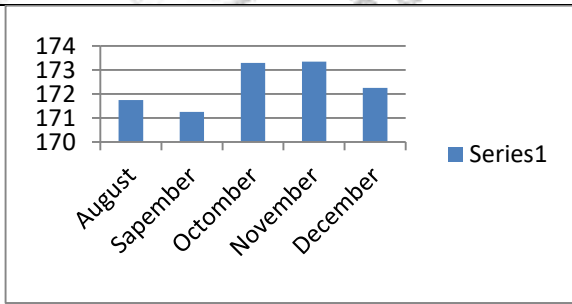
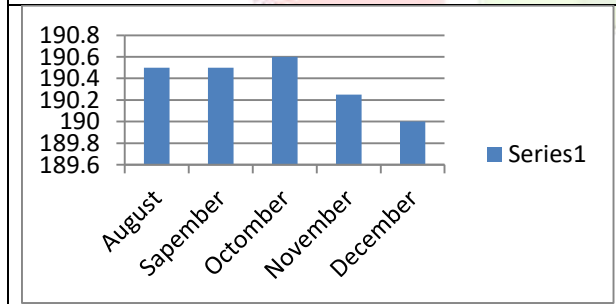
The present study was carried out on Adol Dam, Dist. Washim for the period of five months (August to December). The water of Adol Dam is used for drinking, irrigation and for other domestic purposes and that's why it is important to monitor the water health of the dam water. The various parameters like Colour, pH, Temperature, TDS, Electrical conductivity, Dissolved oxygen, carbon dioxide, Carbonate, Bicarbonate, Total hardness, Calcium, Magnesium, Chloride, Salinity were analyzed. According to WHO standard values the water was found to be potable. On the basis of results of present study, it could be concluded that most of the parameters were within the permissible limit so the water of Adol reservoir was in good state but for the better understanding of Adol dam we recommend a long-term study covering all aspects of water ecosystem.

Month:	August	September	October	November	December
Colure	Olive Green	Olive Green	Olive Green	Olive Green	Olive Green
pH	7.5	7.5	7.5	7.5	7.75
Temperature	25.75	26	26	25.75	25.25
Electrical Conductivity	190.5	190.5	190.6	190.25	190
TDS	171.75	171.25	173.3	173.35	172.25
DO	5	4.9	4.5	3.9	3.6
CO2	Absent	Absent	Absent	Absent	Absent
Carbonate	190	220	215	215	175
Bicarbonate	153	154	175	152	147.5
Total Hardness	300	304	133	291	290
Calcium Hardness	110.75	111.5	111.97	111.97	111.4
Magnesium Hardness	189	192.5	21.02	178.01	179.38
Chloride	92.17	97.48	85.	104	77.99
Salinity	166.39	175.99	163.20	188.78	140.79



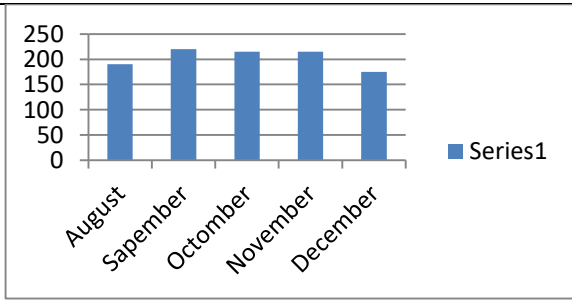
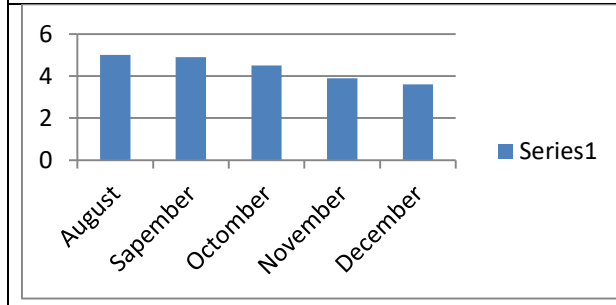
Monthly changes in pH from four sampling sites.

Monthly changes in Temperature from four sampling sites.



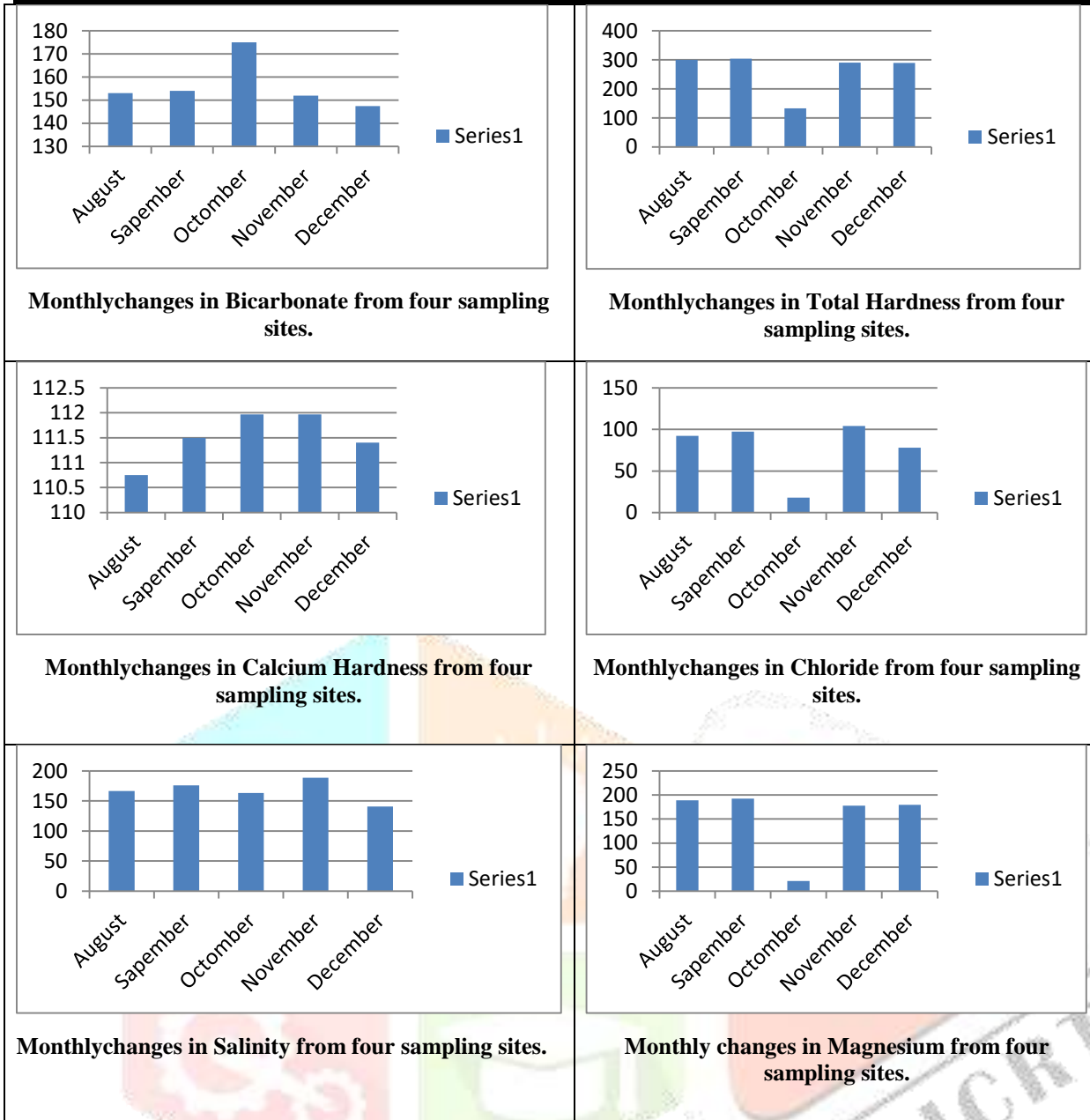
Monthly changes in Electrical conductivity from four sampling sites.

Monthly changes in TDS from four sampling sites.



Monthly changes in DO from four sampling sites.

Monthly changes in Carbonate from four sampling sites.



Graph Plate I

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