



Original Article

Study of Physico-Chemical Parameters from Lower Pus Dam, Weni (Bk) Tq.Mahagaon District Yavatmal, Maharashtra, India

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Abstract

Lower pus dam is earth-fill dam on Pus River near pusad in the Yavatmal district. The opening year of the dam was 1980. It was constructed by the Government of India. Its co-ordinates are 19.818247° N and 77.680283° 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 479 km³ (115cu mi) and gross storage capacity is 15,270.00km³(3,663.47 cu mi). Lower Pus Dam is considered as drinking water source for Weni (BK) town and irrigation many habitats. The Primary source of water is used for domestic consumption, Drinking purpose irrigation, and livestock. Now a days water get polluted due to increasing the anthropogenic pressure, domestic sewage, industrial effluents, and agriculture runoff, seasonal variation, unregulated discharge waste water so as the change the water quality. The research is importance assessing the water quality. We are analysis following The water parameter like that, physicochemical parameters such as, Air temperature, Water temperature, pH , Dissolved oxygen, Alkalinity, TDS, Conductivity, Chlorides, Phosphates, Nitrates, Total Hardness were studied. Evaluate the dam's water quality. The work is undertaken to investigate the physico-chemical characteristics of water to known whether the water is potable or non-potable. Observed the values of water samples have been compared to by the World Health Organization.

Keywords: Lower Pus Dam , Physic-chemical Parameter , Seasonal Variation

Introduction:

Water is a fundamental natural resource and most essential necessity to both natural ecosystem and human life. Natural water is extremely varied in chemical composition and factors controlling the composition include physical, chemical and processes .The natural water bodies are strength of plant and a source of energy for living organisms, healthy aquatic life is also depends on the quality of water hence, it is known as universal solvent since it dissolved more than 95 components from the environment. We depend on the water for irrigation, industries, domestic need, disposal of waste etc. Rain fall is main source water. This research aims to assess the quality of the reservoir's water and analyse the socio-economic consequences experienced by the affected communities. Industrial waste and the municipal solid waste have emerged as one of the leading cause of pollution of surface and ground water. (Odum, 1971), it directly linked the human health. Water plays an important role of human life. It is necessary for industry and living thing resistance. All living organisms on the earth need water for their survival and growth, on our earth having about 70% of water (Balsane et.al. 2015). Total water reservoir of the world about 97% is salty and only 3% is fresh water (Kamble et.al, 2011).Water is universal solvent; in it dissolved the inorganic and organic substance.

Materials and Methods:

The water samples were collected monthly during the investigating period one year Between "June -2024 to May-2025". Select the sampling site, Samples were collected in the clean and plastic bottles brought Samples were analysis of physico-chemical parameters in laboratory. In laboratory water samples were analysed the following physic -chemical Parameter Air temperature Water temperature pH , Dissolved oxygen, Alkalinity, TDS, Conductivity, Chlorides, Phosphates, Nitrates ,Total Hardness. APHA (1998) and NEERI (2007) prescribed methods used in laboratory for further investigation.

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Study Area:

Selected study area was Lower Pus Dam, Tq. Mahagaon District Yavatmal, Maharashtra India, it is Its co- ordinates are 19.818247° N and 77.680283° 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).

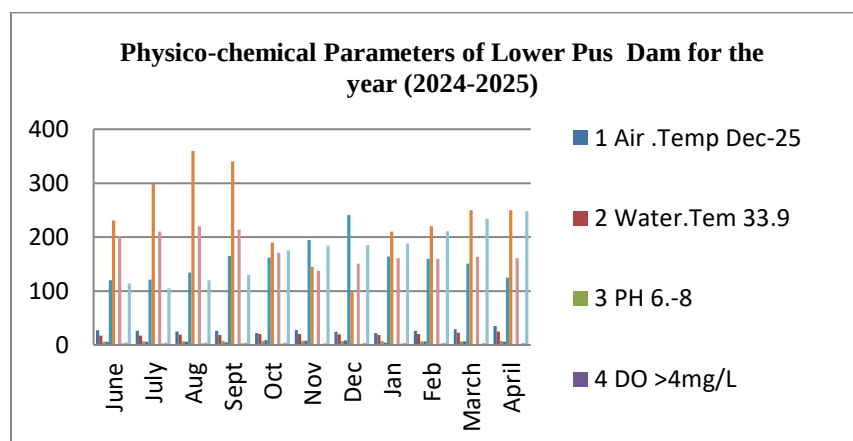
Fig. photograph of Lower Pus Dam weni (bk) tq.mahagaon district yavatmal, maharashtra, india.

Result and Discussion:

Analysis was carried out for various water quality parameters such as 11 parameter, these were Air temperature, Water temperature, pH, Dissolved oxygen, Alkalinity, TDS, Conductivity, Chlorides, Phosphates, Nitrates, Total Hardness. The parameters were analysed by prescribed standard method. The variation in various parameters of different samples is shown in Table-1.

Table 1 Physico-chemical Parameters of Lower Pus Dam for the year (2024-2025)

Sr.no	Parameters	WHO Std	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May
1	Air .Temp	12-25	22.18	26.2	25.2	26.3	22.3	27.4	24.2	22.20	26.20	29.25	35.1	39
2	Water.Tem	33.9	17.2	17.50	19.20	18.20	20.5	20.1	19.5	18.20	20.15	22.50	25.10	35.1
3	PH	6-8	6.2	6.4	6.9	7.5	7.1	8.08	7.10	7.2	6.8	6.9	7.4	6.4
4	DO	>4mg/L	6.1	6.2	6.3	4.9	8.9	8.12	8.5	4.2	6.7	6.9	6.1	6.4
5	Alkinity	200mg/L	117	121	134	165	162	195	238	164	160	151	125	131
6	TDS	266mg/L	231	300	363	340	190	145	103	210	220	250	250	300
7	Conductivity	1000mS/cm	0.47	0.48	0.44	0.46	0.35	0.37	0.38	0.34	0.35	0.36	0.34	0.35
8	Chlorides	250mg/L	201	210	220	214	171	138	151	161	160	163	161	160
9	Phosphate	0.3 mg/L	3.41	3.72	3.50	3.47	2.90	2.10	2.72	2.83	2.80	2.75	2.69	2.65
10	Nitrates	10mg/L	4.50	4.45	4.38	4.43	4.37	2.88	3.87	3.75	3.71	3.70	3.66	3.52
11	Total Hardness	300mg/L	114	101	120	130	175	184	185	188	211	234	248	269

**Physicochemical parameters Analysis:****Temperature in °C:**

In present investigation in Lower pus dam I found the Maximum temperature was in the Month of May 39°C and Minimum in the month of June 17.2°C.

PH: It is the scale which measures the intensity of acidity and alkalinity of water with the measurement of the concentration of H⁺ ions. PH of water is an important environmental factor which affects the biology and the life cycle of the biotic life. Present

investigation of lower pus dam Maximum Ph value was 8.08 in Month of November 2024, and Minimum Ph values was 6.2 in the Month of June 2024, The PH values of water samples varied between 6.1 to 8.10 and were found above the limit prescribed by WHO.

Dissolve oxygen:

Dissolved oxygen is an important parameter in water quality assessment as it regulates much metabolic and physiological process of biotic components. (Bade BB, Kulakarni DA and Liimbhar). The DO values indicate the degree of pollution in water bodies. Dissolved oxygen use the winkers methods .The lower pus dam Maximum values of the DO was 8.12mg/L.in the month of November- 2024 and Minimum values of the Do was 4.2mg/L, in the month of January -2025.

Alkinity:

The amount of acid required to titrate the bases of the given water sample is a measure of its alkalinity. Bicarbonates, carbonates and hydroxides are considered to be the chief bases in natural water. Water samples containing bases turn yellow by the addition of methyl orange indicator. Alkalinity of water samples was estimated in laboratory by using standard method as described by Trivedy and Goel. (1986). In the lower pus dam maximum values of the Alkinity in the month of December 238mg/L June 2024 and I observed the minimum Alkinity in the month of June 2025 the value was 117 mg/L. and in present investigation I found the Alkinity was beyond the permissible limit.

Total dissolved solids (TDS) :-

In present study TDS content ranges from 100 mg/lit to 363 mg/lit. The water is not suitable for drinking purpose. Higher concentration affects the clarity of water and directly affects the penetration of solar energy up to the bed of the Dam, thus promoting decaying process. In the Lower Pus dam maximum values of the Total dissolved solids was 363 mg/L in the month of August and minimum value was 103 mg/L in the month of A December 2024.

Conductivity: Measures the water's ability to conduct electricity, which is influenced by the presence of dissolved ions. I observed that present study of conductivity of water body Maximum value was 0.48mS/cm in the month of July 2024 and Minimum values of water samples was 0.34mS/cm in the month of April2025.

Chloride: chloride in water bodies can come from various sources such as the Natural and Human activities. High concentration of chlorides can be effect on the aquatic life, water quality, and infrastructure. Use the Standard test method titration with Silver Nitrate .in the present study the chloride water sample Maximum value was the 220mg/L in the Month of August and Minimum value was 138 mg/L in the month of April 2025. I found the chlorides value was within the permissible limit.

Phosphates : source of phosphates is the Agricultural Runoff fertilizers and manure, waste water –domestic and industrial can contain the phosphate, and natural sources due to create the phosphate pollution , Excessive Phosphates can lead to the algae growth, and depleting oxygen and harmful aquatic life known as eutrophication process. In laboratory use the colorimetric method. The present study of lower pus dam Maximum phosphates value was 3.72mg/L in the month of July 2025 and Minimum value was in the 2.10mg/L.

Nitrates: Nitrates are found in the soil, water, agriculture runoff, waste water, and in the industrial processes. Environmental impact of nitrates in water pollution excessive nitrates in water bodies can lead to eutrophication, harming, and aquatic ecosystems. In soil high nitrates levels in soil can contribute to soil degradation and reduced fertility. The Lower Pus Dam nitrates maximum value was 4.50mg/L in the month on June 2024.and Minimum value was 2.88mg\`L in the month of November 2024.

Total Hardness: Water hardness is measured in terms of the amount of calcium carbonate water hardness of soft water is 0.60 mg/L, Hard water is 61-120 mg/L and very hard water is above 181mg/L. water hardness trend to increase during summer month.in the present study was the total hardness maximum values was 269mg/L in the month of May 2025.and Minimum value was 101mg/L in the month of July2024. This parameter is within the permissible limit.

Conclusion:

In the present study of lower pus dam water samples analysis of physicochemical parameter .In the present study most of the parameters are found within the prescribe limit and comprised to WHO standards. Only for Alkinity was beyond the permissible limit.

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