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An Investigation of the Seasonal Variation of Some Physico-chemical Parameters in the Zari Dam, Tq. Pathri, Parbhani (M.S.), India.

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Abstract

The main objective of this study is to maximize the advantages of water usage for irrigation through the Zari Dam while also taking into consideration the limitations of the issue. The connection between working closely with sewage and water purification, dam and water catchment management, and other related fields is explored in this study. Additionally, it examines the effects of human actions harmed ecosystems. It establishes guidelines for managing water resources and preventing pollution. Identifying the some physico-chemical parameters such as water temperature, conductivity, total dissolved solids, turbidity, pH and alkalinity of Zari Dam would be facilitated by the seasonal variation.

Keywords: *Zari Dam***,** *Irrigation*, *Ecosystems* and Seasonal variation**.**

Introduction

Dams are critical infrastructures for water storage, irrigation, flood control, and energy generation. However, their operation significantly influences the physicochemical and biological characteristics of aquatic ecosystems. Khiradkar *et al.*, (2017) highlighted the importance of monitoring parameters such as total dissolved solids, conductivity, pH, alkalinity levels, and the impact of anthropogenic activities and seasonal factors on water quality. These studies found that fluctuations in nutrient concentrations and organic matter, driven by agricultural runoff and local usage, directly affect aquatic ecosystem health and productivity. Hydrobiological diversity and water quality dynamics in regional dams and lakes. The crucial need for integrated approaches to water resource management, conservation, and ecosystem restoration in dam reservoirs (Ingale *et at.*, 2018).

Dam water plays a critical role in irrigation by ensuring a reliable and regulated supply for crops, which is essential for food security, livelihoods, and regional development. Dams store water during periods of surplus and release it during dry spells, thereby alleviating the impacts of drought, enabling multiple cropping cycles, and increasing agricultural productivity (Binnie, 2004; ICID, and BBMB, 2023). The physico-chemical parameters of dam water such as pH, dissolved oxygen, hardness, alkalinity, chloride, phosphates, nitrates, and temperature are vital for evaluating its suitability for irrigation and broader usage. Consistent monitoring of these parameters helps protect crop health, prevents soil degradation, and ensures safe water quality for irrigation purposes (Hemant Kumar *et al.*, 2016; Ouhakki *et al.*, 2024).

Material and Methods

Sampling locations were chosen in four separate sections of the Zari dam, which was easily accessible for gathering samples for physico-chemical analysis, during the study period. Between the hours of 8. 00 and 10. 00 in the morning, samples and parameters were taken at various locations. The Zari dam sampling stations are Z1, Z2, Z3, and Z4. The primary goal of the current research is to examine a few physicochemical properties. The study of water samples should ideally take place mostly in the field. All stations should use the methods described by APHA (2012) to measure parameters like water temperature, conductivity, total dissolved solids, turbidity, pH, and alkalinity.

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The course of this research lasted a year, from July 2022 to June 2023. The seasons are discussed on a monthly basis in this study, with July through October being referred to as monsoon season, November through February being referred to as winter season, and summer is from March to June. The physico-chemical parameters pertaining to water quality that are based on the parameters are displayed in tabular and graphical form (Tables 1 to 4 and Figures 1 to 4).

Results and Discussion

Water temperature of Zari dam water from all the station highest during summer season and minimum during winter season the station - Z1 reported highest mean value 32.325±0.3349 during summer season and station - Z4 lowest reported 23.008±1.3869 during winter season. Conductivity from station - Z1 highest mean value 420.25±26.253 in monsoon season and lowest mean value 293.25±23.585 during winter season. Total dissolve solids maximum in the season of monsoon and minimum during the season of winter the peak values mean 352±11.188, from the station - Z1 and graph down during winter 228.25±7.239 at station - Z4. Turbidity showing minimum mean value 4.9125±0.6404 noted from station - Z4 in the season of winter and highest mean value 13.425±0.9105 at station - Z1 during summer season. The mean value 8.75±0.1041, of pH showing utmost during the summer season at station - Z1 and lowermost 7.425±0.0629 at station Z4, in the winter season. Alkalinity showing maximum mean value 147±6.1237 at station - Z1 during the summer season and minimum mean value 68.75±3.1721 reported at station - Z4 during the season of winter. All the physico-chemical parameters under the permissible limit as per the BIS (2012) and WHO (2022). Identical findings reported by Khiradkar *et al.*, (2017) from Labhansarad dam Warora, dist. Chandrapur. Gudhe *et al.*, (2019) from Matkazari dam, Nagpur (M.S.) also showing corroborated results with present investigation. Analogous results reported by Shende and Maryam (2023) from Saikheda dam dist. Yavatmal, (M.S.), India.

Conclusion

Although the current Zari dam water quality is generally satisfactory, the area around the dam poses slightly dangers from human activity and natural events. Consistent monitoring and efficient management practices are highly advised in order to guarantee the future viability of this crucial water supply. Inlet of fresh water source is the main reason to dilute the water of Zari dam but other side inlet from village is highlighted slight pollution. Public awareness campaigns might promote community action to safeguard the water quality of the dam, and proactive measures should be implemented to reduce pollution from agricultural runoff.

Table no. 1: Seasonal variation values of physico-chemical parameters of water in Zari dam, Tq. Pathri, District Parbhani (MS) India stations Z1, during July 2022 to June 2023.

Sr. No.	Seasons → Parameters↓	Monsoon Mean	SE	Winter Mean	SE	Summer Mean	SE	Annual Average Mean	SE
1.	**Water temp.**	28.06	0.3388	23.545	1.3085	32.325	0.3349	27.977	2.1953
2.	**Conductivity**	420.25	26.253	335	5.7591	363.75	6.524	373	21.686
3.	**T.D.S**	352	11.188	266	11.188	299	9.704	305.67	21.693
4.	**Turbidity**	10.1	1.1867	5.6	0.6351	13.425	0.9105	9.7083	1.9636
5.	**pH**	8.05	0.119	7.8	0.108	8.75	0.1041	8.2	0.2462
6.	**Alkalinity**	115.75	4.6075	101.25	4.2696	147	6.1237	121.33	11.69

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Table no. 2: Seasonal variation values of physico-chemical parameters of water in Zari dam, Tq. Pathri, District Parbhani (MS) India stations Z2, during July 2022 to June 2023.

Sr. No.	Seasons → Parameters↓	Monsoon Mean	Monsoon SE	Winter Mean	Winter SE	Summer Mean	Summer SE	Annual Average Mean	Annual Average SE
1.	**Water temp.**	28.425	0.5175	23.33	1.3702	31.593	0.5332	27.783	2.0843
2.	**Conductivity**	417	26.353	331.25	6.5749	361	5.9582	369.75	21.77
3.	**T.D.S**	345	11.188	259	11.188	292	9.704	298.67	21.693
4.	**Turbidity**	9.175	0.9123	5.2	0.6351	12.7	0.736	9.025	1.8761
5.	**pH**	7.775	0.0854	7.525	0.1109	8.45	0.0866	7.9167	0.2392
6.	**Alkalinity**	102.5	5.6789	84.5	3.0687	132.75	6.7253	106.58	12.191

Table no. 3: Seasonal variation values of physico-chemical parameters of water in Zari dam, Tq. Pathri, District Parbhani (MS) India stations Z3, during July 2022 to June 2023.

Sr. No.	Seasons → Parameters↓	Monsoon Mean	Monsoon SE	Winter Mean SE		Summer Mean	Summer SE	Annual Average Mean	Annual Average SE
1.	**Water temp.**	27.86	0.3705	23.15	1.3715	31.143	0.5668	27.384	2.0087
2.	**Conductivity**	410	26.353	324.25	6.5749	354	5.9582	362.75	21.77
3.	**T.D.S**	334.75	10.958	246.5	10.958	283.25	9.232	288.17	22.165
4.	**Turbidity**	9.425	1.1842	4.9125	0.6404	12.67	0.9571	9.0025	1.948
5.	**pH**	7.825	0.1109	7.55	0.0866	8.45	0.0957	7.9417	0.2306
6.	**Alkalinity**	102.75	3.4881	85	3.4881	132.25	6.524	106.67	11.934

Table no. 4: Seasonal variation values of physico-chemical parameters of water in Zari dam, Tq. Pathri, District Parbhani (MS) India stations Z4, during July 2022 to June 2023.

Sr. No.	Seasons → Parameters↓	Monsoon Mean	Monsoon SE	Winter Mean	Winter SE	Summer Mean	Summer SE	Annual Average Mean	Annual Average SE
1.	**Water temp.**	27.75	0.365	23.008	1.3869	30.63	0.6786	27.129	1.9245
2.	**Conductivity**	293.25	23.585	218.25	6.8237	244.25	4.3469	251.92	19.042
3.	**T.D.S**	228.25	7.2399	140.5	7.2399	179.75	7.576	182.83	21.978
4.	**Turbidity**	5.825	0.2428	3.75	0.3476	5	0.2972	4.8583	0.5224
5.	**pH**	7.675	0.1031	7.425	0.0629	8.325	0.075	7.8083	0.2323
6.	**Alkalinity**	82.5	3.1225	68.75	3.1721	100.75	4.4791	84	8.0263

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Fig. no. 1: Bar showing Seasonal variation values of physico-chemical parameters of water in Zari dam, Tq. Pathri, District Parbhani (MS) India stations Z1, during July 2022 to June 2023.

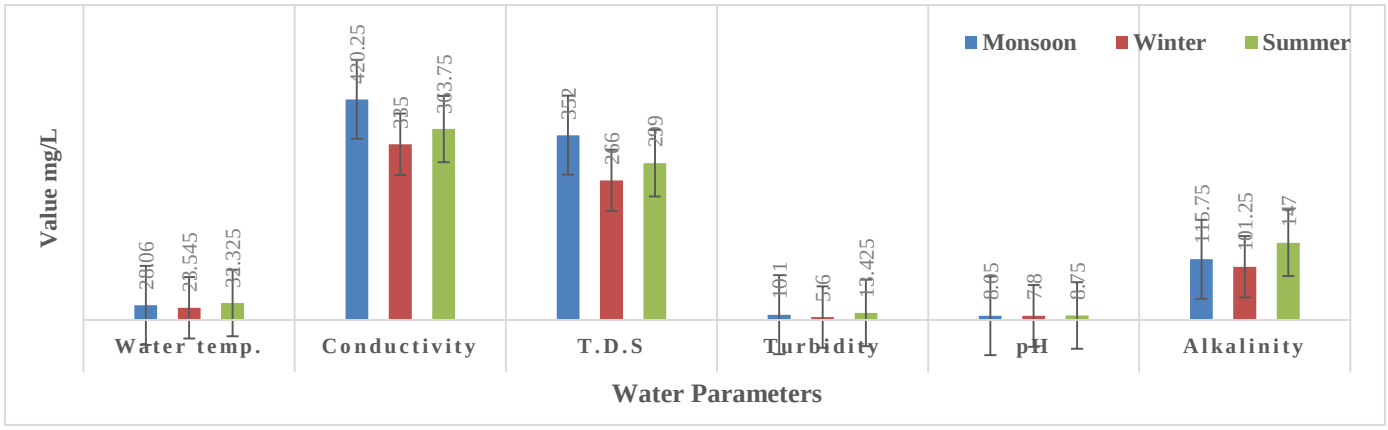

Fig. no. 2: Bar showing Seasonal variation values of physico-chemical parameters of water in Zari dam, Tq. Pathri, District Parbhani (MS) India stations Z2, during July 2022 to June 2023**.**

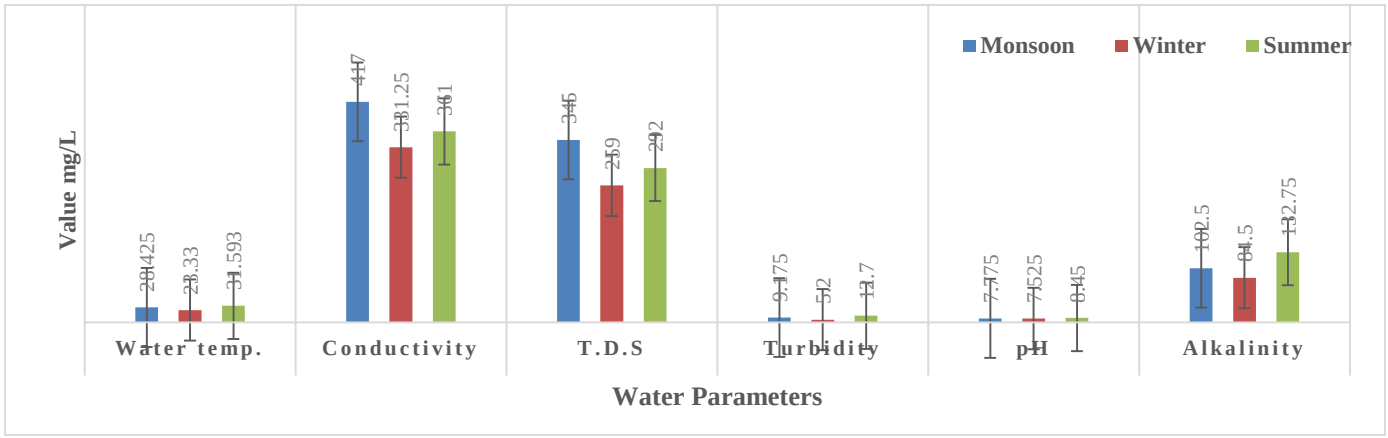

Fig. no. 3: Bar showing Seasonal variation values of physico-chemical parameters of water in Zari dam, Tq. Pathri, District Parbhani (MS) India stations Z3, during July 2022 to June 2023**.**

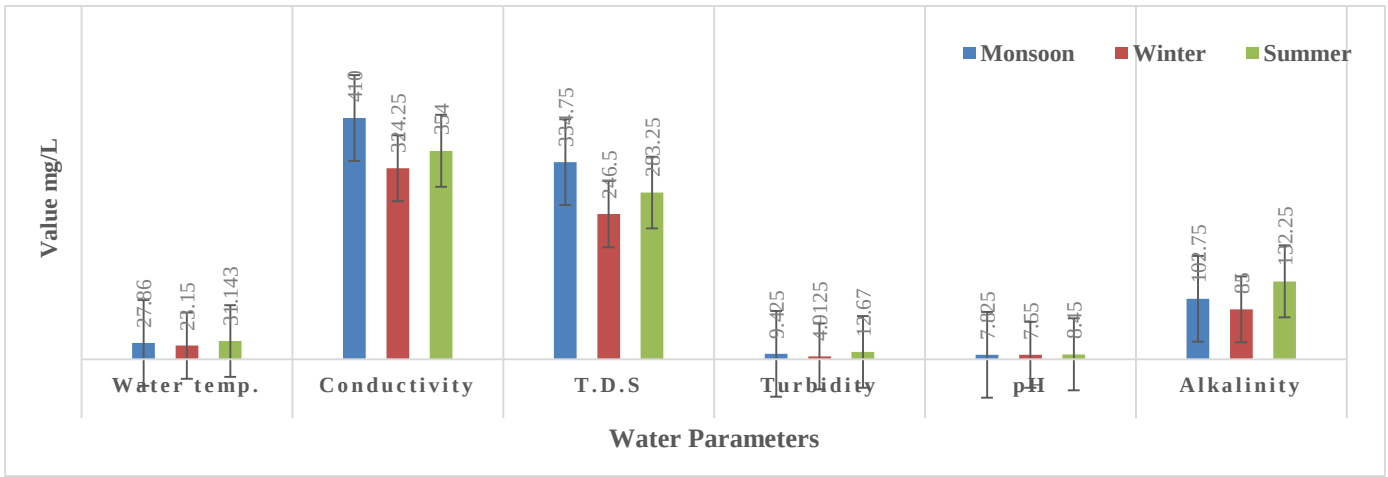

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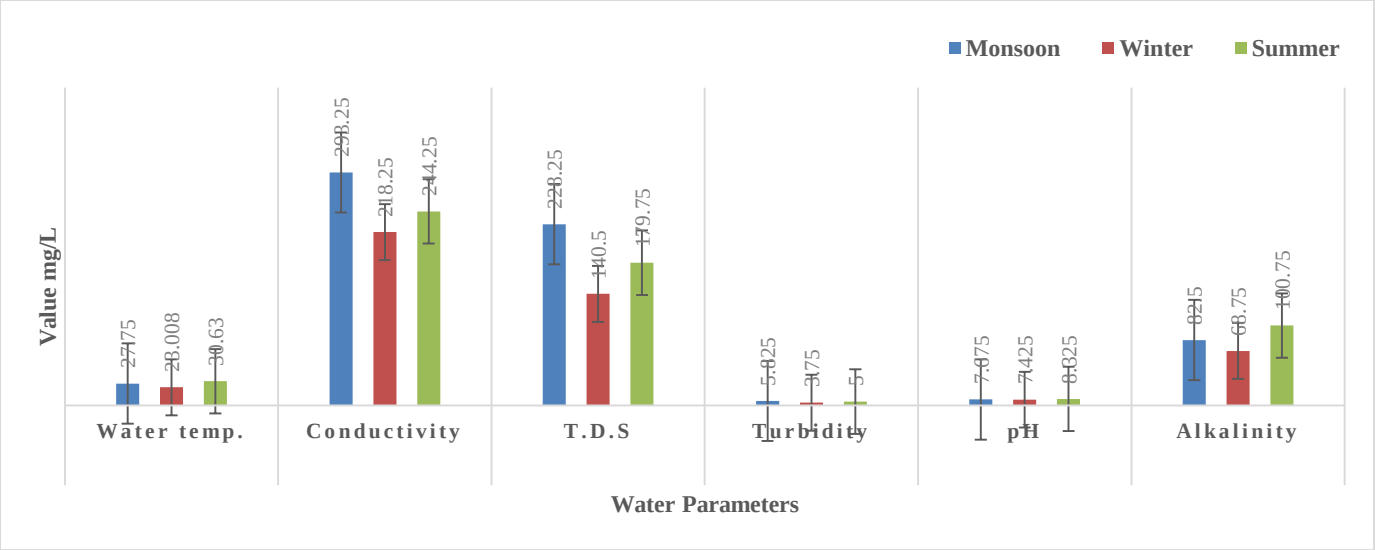
Fig. no. 4: Bar showing Seasonal variation values of physico-chemical parameters of water in Zari dam, Tq. Pathri, District Parbhani (MS) India stations Z4, during July 2022 to June 2023.



References

APHA (2012). Standard Methods for the Examination of Water and Waste Water. 22nd Edition, American Public Health Association, American Water Works Association, Water Environment Federation.

Bhakra Beas Management Board (BBMB) (2023). Benefits Of Large Dams. BBMB Website.

Binnie, C.J.A. (2004). The benefit of dams to society. In: Proceedings of the British Dam Society 13th Conference, Canterbury, UK, pp. 1–12.

Bureau of Indian Standards (2012). IS 2296: Water quality criteria for designated best use. New Delhi: BIS.

Gudhe Rahul G., Patil Kishor G., Ingle Prashant P., Kamdi R. R. and Khiradkar Sandip (2019). A study of seasonal fluctuations of few physicochemical parameters and accordingly the potability of water in Matkazari Dam, Nagpur (M.S.). International Research Journal of Natural and Applied Sciences. Volume 6 (6). 57-61.

Hemant Kumar, Gazala Ansari, Shahzadi Bano, Sheeba Qureshi, Ajay Kumar, Prachi Arya, and Kiran Kushwaha (2016). Chemical Studies of Garia Dam, Jhansi, India. Plant Archives, 16(2), pp. 1351-1353.

Ingale, Prashant P., Bobdey, Atul D. and Gorghate, Nilesh D. (2018). Comprehensive hydrobiological status of Bhiwapur Lake of Maharashtra, India: an environmental aspect. Journal of the Chinese Advanced Materials Society (Taylor and Francis), Vol. 6(4), 655–665.

International Commission on Irrigation and Drainage (ICID) (n.d.). Role of Dams for Irrigation, Drainage and Flood Control. ICID Website.

Khiradkar, Sandeep S., Kambdi, Ramdas R., Ingale, Prashant P. and Gorghate, Nilesh D. (2017). Preliminary study of some physicochemical parameters in Labhansarad dam in Warora Taluka of Chandrapur District, Maharashtra State, India. International Journal of Researches in Biosciences, Agriculture and Technology, Vol. 5(2).

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Online version ISSN 2320 3188

Ouhakki, H., Taouil, H., El Fallah, K., Zerraf, S. and El Mejdoub, N. (2024). Spatiotemporal evolution of the physicochemical characteristics of dam water. Journal: Science of the Total Environment, Elsevier. Volume 26 (10): 389–402. doi.org/10.12911/22998993/207193.

Sujata H. Shende and Maryam Begum Mohammad Abuzar (2023). Monthly investigation of some physico-chemical parameters in Saikheda Dam Dist. Yavatmal, (M.S.), India. International journal of basic and applied research (ijbar). Volume 13, (1): 88-93.

World Health Organization (2022). Guidelines for drinking-water quality: Fourth edition incorporating the first and second addenda. Geneva: WHO.