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Evaluation of Water Quality of Kerwa and Kolar Dam at Bhopal District of Madhya Pradesh for Irrigation Prospectives.

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ABSTRACT: Now a day's water pollution problem in the world has become more severe day by day. Over exploitation of water resources due to ever increasing human developmental activities has become cardinal concern because of declination in water quality.To evaluate the suitability of water for irrigation prospective a hydro-chemical study of Kerwa and Kolar Dam water in Bhopal (M.P.) has been conveyed. In the present investigation all the water quality parameters like. pH, alkalinity, EC, TDS, TH, chloride, nitrate, iron, magnesium, and calcium were found to be in WHO (World Health Organization) and BIS(Bureau of Indian Standards) permissible limits. The values obtained were in the range of permissible limits, therefore water of Kerwa and Kolar Dam can be used for irrigation purposes.

Keywords: Water pollution, developmental activities, irrigation purposes.

I. INTRODUCTION:

Water is indispensable constituent of all living creatures on the earth. The ground and surface water resources play a significant role in industrial, agricultural, aquaculture and hydropower apart from proving potable water[1]. A number of biological processes in the bodies of all living creatures required water, therefore water is the most essential part for the growth and maintenance of living organisms.In the developing country like India water pollution have reached in critical stage due to unplanned industrialization and urbanization. Owing to unplanned urbanization and intensive industrialization all water resources suffering from direct negative impacts[2,3]. Water pollution is "ANY PHYSICAL, CHEMICAL OR BIOLOGICAL ALTERATIONS IN WATER QUALITY THAT HAS AN ADVERSE EFFECTS ON LIVING BEINGS OR MAKES WATER UNFIT FOR DESIERED USES"[4].

The composition and concentration of dissolved components in water regulate its quality for agricultural use. Water quality is a significant cogitation in any assessment of alkalinity or salinity conditions in an irrigated land. The good quality of water has the potential to cause highest yield on the other hand poor quality of water can develop various cropping and soil problems. Therefore, continuous, reliable, regular, and effective monitoring of water quality is mandatory for the good health of water bodies in order to maintain full crop productivity.

Study Area: Kerwa Dam is established in Mendora village of Bhopal district in Madhya Pradesh, India. The water of dam is the main source of potable water for a part of the Bhopal city. The area around the dam is rich in biodiversity and famous for its beauty and popular as picnic spot and attracts several tourists. The catchment area of dam is 34.5 sq kms for water availability and its gross storage capacity is 25 M cum. Coordinates- 23.174235ºN 77.365169ºE.Kolar dam is raised on Kolar River which is a tributary of Narmada River. It is situated on 35 kms south-west of Bhopal city. Dam is constructed near Lawakhweri village in Sehore district. it is about 45 m high;length is 590 m and maximum storage capacity is 270 Mcm. It is an important source of water supply for point of Bhopal[5]. Coordinates-22.959520ºN 77.346175ºE.

II. MATERIALS ANDMETHODS:

The present investigation was performed in the month of May 2022 the water samples collected from both the dams Kerwa and Kolar in clean polyethylene container in morning hours. The parameters like pH, turbidity and temperature of water sample were noted at the site. the parameters like Electrical Conductivity (EC), Total Dissolved

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Solids (TDS) were examined by standard methods (APHA, AWWA, WEF, 1998). Total Hardness (TH), alkalinity, chloride, calcium (Ca), magnesium (Mg) ions were dictated by titration method. Iron, sulphate, nitrate was analyzed by spectrophotometer method prescribed inAPHA[6].

III. RESULTS:

Table showing evaluation of water quality of Kerwa and Kolar Dam

Parameters	Unit	BIS Standards	Column 1	WHO Standards	Column 2	Kerwa Dam	Kolar Dam
		Per	Excess	Per	Excess		
Temperature	°C	-	-	-	-	29.1	29
Turbidity	NTU	5	10	-	-	2.6	4.9
Colour	Hazen	5	25	-	-	-	-
pH	-	6.5 - 8.5	6.5 - 9.2	6.5 - 8.5	6.5 - 8.5	7.3	7.7
EC	micromhos /cm²	-	-	-	-	271	289
TDS	mg/L	500	1000	500	1000	174.2	142.9
Alkalinity	mg/L	200	600	200	600	139	141.1
Chloride	mg/L	250	1000	200	600	22.3	14.6
TH	mg/L	300	600	100	500	146	58.29
Calcium	mg/L	75	200	75	200	37.1	20.9
Magnesium	mg/L	30	70	30	150	10.9	14.2
Iron	mg/L	0.3	1	-	-	0.02	0.09
Nitrate	mg/L	45	45	45	45	10.2	8.6

Temperature is a limiting factor, plays a vital role in system. The water temperature foundKerwa dam was 29ºC and Kolar dam was 29.1ºC.due to the presence of colloidal substances, aquatic growth, inorganic components, and decomposition of vegetation water have color and order. The water samples of both the dam found colorless, odorless, and clear.Higher values of pH in water fastening the scale formation in water heating equipment and lowers down the germicidal potential of chlorine. The pH of Kerwa 7.3 and Kolar 7.7 was noticed. Electrical conductivity is a good measure to quantify dissolved solids in water and in determining the water suitability for agricultural purposes. EC of Kerwa was 271microhos/cm^2 whereas Kolar 289 microhos/cm^2 observed. Total Dissolved Solids indicates the salinity of water. Water with high TDS produces scales on containers and boilers. TDS of Kerwa 174.2 mg/L and Kolar 142.9 mg/L was found. Presence of bicarbonates, hydroxide or carbonates shows the alkaline nature of water, main source is weathering of rocks. Alkalinity of Kerwa was 139 mg/L and Kolar 141.1 mg/L was found. Presence of high chloride in water is because of pollution from chloride rich effluents of sewage and municipal waste. High chloride causes laxative effects. Kerwa contains 22.3 mg/L and Kolar 14.6 mg/L of chloride. Total Hardness is due to the presence of salts of calcium and magnesium, and by eutrophication, causes excess hardness not permissible for drinking water. TH of Kerwa 146 mg/L and Kolar 58.29 mg/L was calculated. The presence of calcium and magnesium is due to industrial waste sewage, and weathering of rocks. Hard water causes increase risk of heart diseases and makes the water unfit for drinking and shows laxative effects. The Ca and Mg concentration of Kerwa Dam was 37.1 mg/L (cu) 10.9 mg/L (Mg) and for Kolar Dam 20.9 mg/L(Ca) and 14.2 mg/L (Mg) was observed respectively. High iron content in water causes corrosion of pipes and increases the risk of formation of kidney stones. Iron content of Kerwa was 0.02 mg/L and Kolar was 0.01 mg/L found during the research. The major source of nitrate is industrial effluents, fertilizers, human and animal waste, chemicals and sullage through drainage system. When nitrate concentration exceeds to 40 mg/L causes “Methemoglobinemia” or “Blue Baby Syndrome” in children. The level of nitrate of Kerwa and Kolar Dam was observed 10.2 mg/L and 8.6 mg/L respectively.

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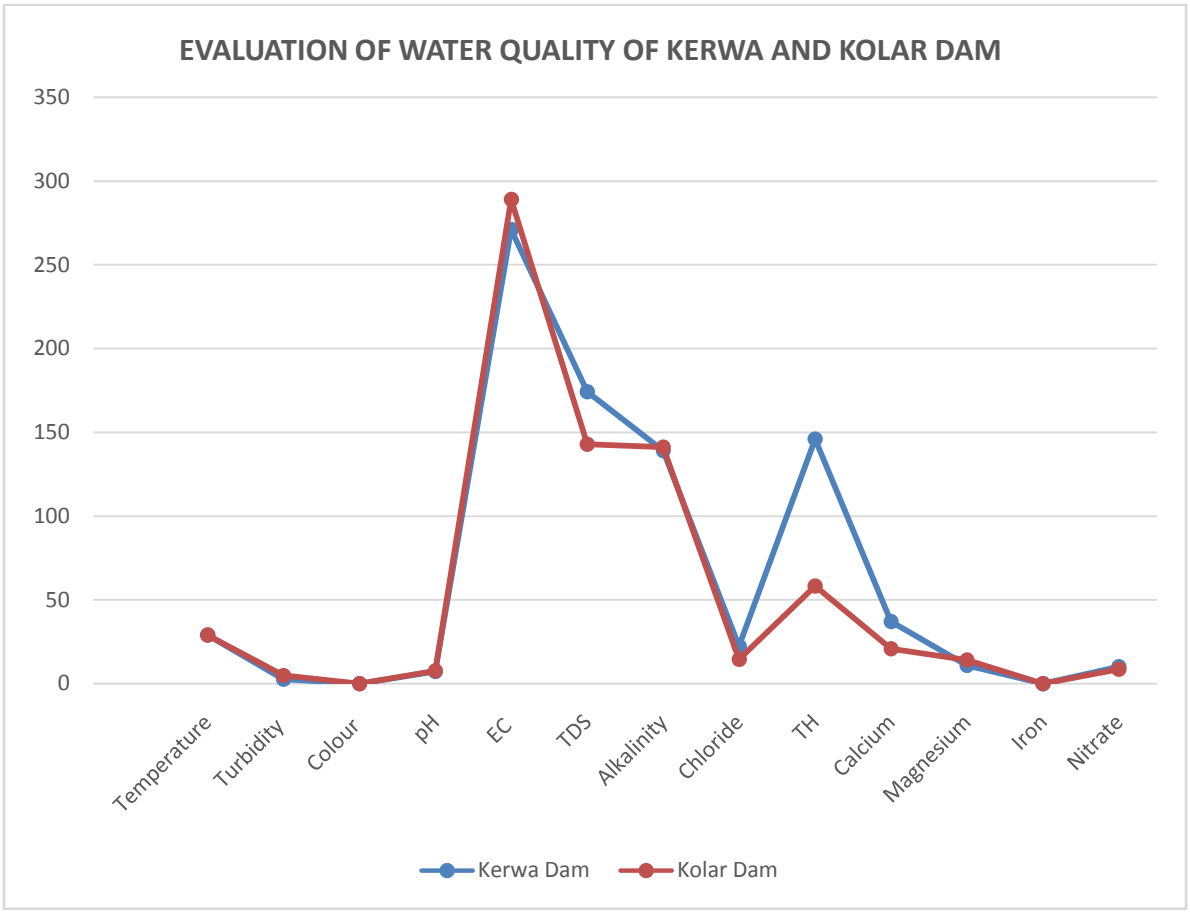

IV. CONCLUSION:

All physic-chemical parameters of both reservoirs were found within the permissible limits of WHO and BIS standard. The declination of potable water requires a prevention method on an urgent basis, which is possible only by the proper understanding as well as support from each one of us.While the obvious way to reduce or eliminate water pollution is to stop industrial waste, doing just that and nothing more would not be enough. Preventive measures such as reduction in plastic consumption, controlling leaks in cars, using fewer pesticides or efficient disposal of chemicals would help us go the extra mile. More steps are required to be taken to ensure an adequate level of clean and pollution free water for the survival of life on the planet. Water is an important aspect of our ecosystem.

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