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Water Quality Index Assessment of Gopi Krishna Sagar Dam, Ruthiyai, Guna District (M.P.), India.

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Abstract- The present investigation is on water quality index of a water body, Gopi Krishna Sagar Dam in Ruthiyai, Guna (M.P.). Ten parameters were selected; pH, TDS, DO, Alkalinity, Total Hardness, Calcium Hardness, Magnesium Hardness, BOD, Chloride, Fluoride. Water samples were collected from three sampling sites. Collected samples were analyzed in laboratory on same day. Observed values were compared with permissible limits as prescribed by Indian standards. WQI value of four seasons was calculated. The WQI results reveal "good" category and water is fit for various use.

Keywords:- Water Quality Index, Gopi Krishna Sagar dam, assessment, category, standard values.

I. INTRODUCTION

India has many dams on rivers. As rivers are the natural fresh water sources. So, its quality is very important parameters. Fresh water is used in various purposes like for drinking, agriculture, industrial and fisheries. Now a days the river water mainly become polluted due to disposal of sewage, municipal waste, industrial waste, agricultural waste and solid waste.

These all disturbance are due to anthropogenic activities and thus spoiling the quality of water day by day. For this, proper monitor on water bodies is needed. The present investigation of water quality study of Gopi Krishna Sagar dam will be helpful for Guna peoples as they use water for drinking, irrigation and fisheries.

II. MATERIAL AND METHOD

1. Study Area:
Gopi Krishna Sagar dam is important water source on Chopan River. It is in Guna district of Madhya Pradesh.

2. Collection of Water:
In present study the physico-chemical parameters of water was studied from sampling stations. The study was conducted from October 2018 to September 2020. Water was collected from all the sites between 7am to 11am. The water of Dam was collected in sterilized polythene cans and physicochemical studies were determined as per the standard method in laboratory, Fig 1, (APHA, 2005).

Fig 1. Collected Dam Water Samples for Analysis.

3. Calculations of Water Quality Index:
The calculation used for water quality index (WQI) of dam was done by weighted arithmetic index method (Nusart et al., 2016).

The quality rating scale

$$Qi = Ci/Si*100$$

Relative weight

$$Wi = 1/Si$$

And

$$WQI = \sum WiQi$$

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and than over all

$$WQI=\sum WiQi/\sum Wi$$

Observed values of parameter were compared with standards values of BIS and CPCB. Status of water quality was categorized in five classes – Excellent (<50), good (50-100) moderately polluted (100-200), severely polluted (200-300) and unfit (above 300).

III. RESULTS AND DISCUSSION

The water quality index was assessed by using physico-chemical parameters at three sampling sites, at four seasons, post monsoon, winter, summer and Monsoon. Results obtained compared from analysis of dam water are compared with standard values of BIS and CPCB.

The water quality index obtained from three station of both the years i,e October 2018 to September 2020 are presented in Table 1, Fig 2 and Fig 3.

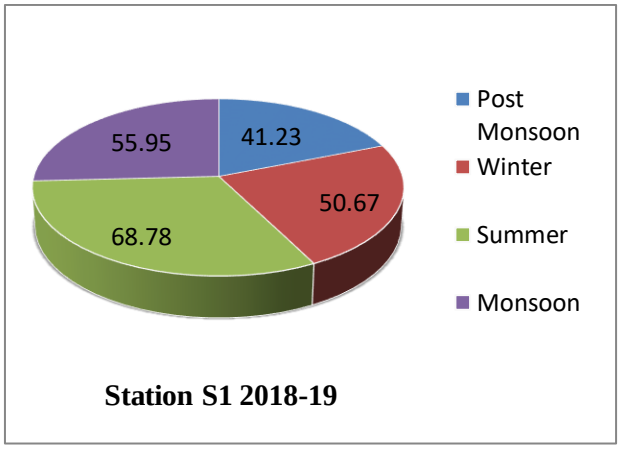
Table 1. Calculation of water quality index of Gopi Krishna Sagar Dam, Ruthiyai
(Two year October 2018 to September 2020).

Sites	Year	Post Monsoon	Winter	Summer	Monsoon
S1	2018-19	41.23	50.67	68.78	55.95
	2019-20	44.65	55.84	73.85	57.5
S2	2018-19	42.42	50.29	68.12	54.25
	2019-20	43.80	54.09	72.27	54.73
S3	2018-19	42.92	51.61	71.24	57.58
	2019-20	46.45	56.24	75.92	58.54

The physico-chemical parameters selected were calculated by standard value and observed value and WQI was estimated.

The result observed reveals that in post monsoon period the quality of water ranged from 41.23 to 46.45 which showed water quality excellent category. During winter season results reveals excellent and good category. In summer season the value raised due to water evaporation and high temperature which increased pH, total dissolve salts, BOD, COD, Hardness, chloride level which indicates entry of pollutants, sewage waste.

DO levels reduce in summer, this affected the water quality which ranged between 68.12 to 75.92, although the category is good but still high than other seasons.



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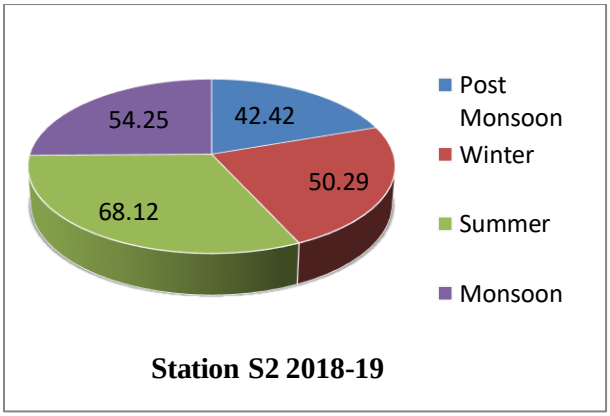

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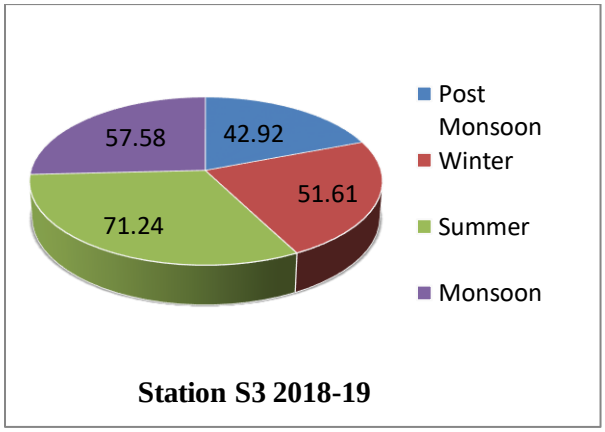

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Fig 2. Showing WQI of Dam Water (Station S1, S2, S3- October 2018 to September 2019).

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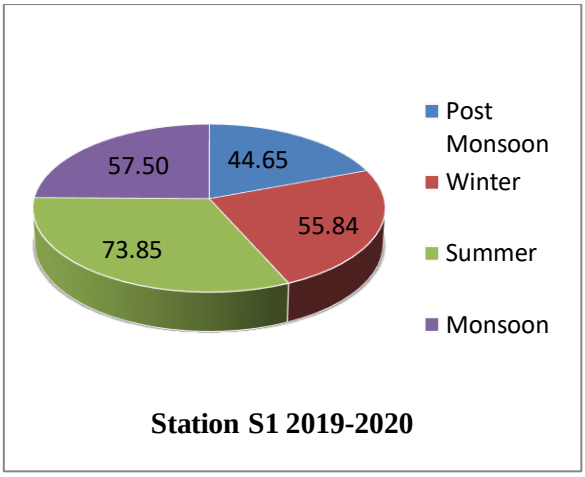

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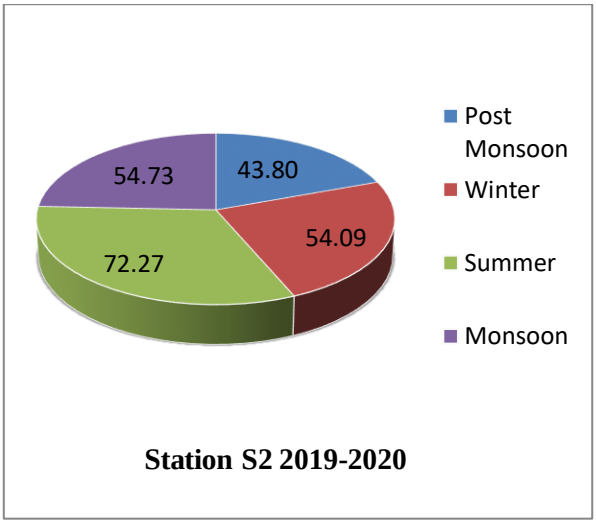

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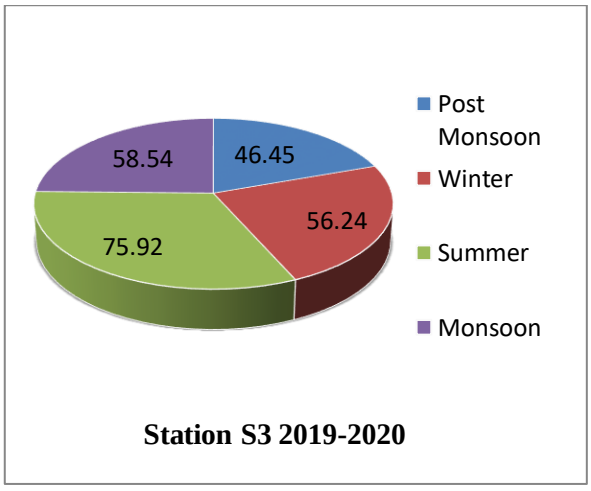

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Fig 3. Showing WQI of Dam Water (Station S1, S2, S3- October 2019 to September 2020).

The pH indicated nature of water slightly basic as similar results of Sai River in U.P (Kumari V et. al, 2015). The WQI indicate river water polluted while passing through the city area. The dam water of Gopi Krishna Sagar dam is good for drinking and domestic purpose as Tillar dam of Pigar Malwa (Bodane 2015), the result obtain in present study revealed dam water is within permissible limit of water quality index and is of good category as supported by (Nusart et al., 2016, Srinivas et al., 2017).

In summers when organic load increases the water quality is affected. The WQI values of Sarfa dam also showed high chloride in summer (Prajapati 2016).

Overall water quality index expresses the water quality in term of index number and provide baseline to determine water quality in term of index number and provide baseline to determine water quality assessed (Kevat et at 2016). The WQI value reported in present investigation are less than 76, indicating good category water.

IV. CONCLUSION

The results obtained revealed that WQI of Gopi Krishna Sagar dam is in good condition. Physico-chemical analysis results indicate that dam water is free from pollution, but in summer certain quality reduces. Still water need treatment, continuous monitoring of dam and Chopan river water is needed by establishing proper management plans.

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