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COMPUTING INTER CORRELATION AND IDENTIFY REGRESSION EQUATION AMONG WATER PARAMETERS IN GRAND ANICUT CANAL OF CAUVERY RIVER

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ABSTRACT

Running water have been collected at 5different locations in G.A. Canal and its PHYSICO - CHEMICAL characters were found thrice in a month for a period of 4 months (a season).Total of 9 parameters have found namely pH, E_C, T.D.S , T.S.S.THD, CL, Temp, salinity and Turbidity. Among these parameters pH and salinity are found uniform in all locations and other parameters are found mild variation in water quality among samples of various locations. A correlation analysis has been carried out among the various parameters from the collected samples. This analysis resulted in significant linear relationship between the water parameters viz.. Total Dissolved Solids (TDS), Total Hardness (THD), Chlorides (CL), Temperature and Turbidity. The usefulness of this study is to predict the correlations between the characteristics in running water is discussed

The flowing water in G.A. canal is mostly found same physical and chemical characteristics in all locations. This analysis resulted that all the water quality parameters are within the permissible standards for various uses. Hence simple treatments are sufficient for utilizing this water for various uses. The equations obtained from the correlation analysis are very useful in the rapid analysis of running water quality.

KEY WORDS: COMPUTING,WATERPARAMETER, GRAND ANICUT, CAUVERY RIVER

1. INTRODUCTION

As a result of increasing industrialization, urbanization, civilization and other development activities, most of our water bodies like ponds, lakes, streams, rivers and waste water bodies have become polluted. The domestic waste, sewage, effluents, agricultural and land drainage etc., are the major sources that cause water pollution.

The quality of water is explained by its physical, chemical and Bacteriological characteristics. These characteristics are many and interconnected. In the correlation analysis some of the correlations are found significant. Then they would be useful in assessing the quality of water.

The Cauvery, the longest river system in the State is polluted by effluents of different industrial units along its course at various points. The severity of the problem has to be seen in Salem and Trichy districts to be believed. The Environmental Society, Madras has launched systematic awareness campaigns to mobolise public support to save the river from dying.

G.A. Canal is a branch canal of Cauvery river which extends up to 109.22 km capacity 4210 cft. Maximum quantity of water flowing through this canal is used for irrigation. This canal covers the ayacut of 2,31,000 acres. The rural peoples who are residing near the banks are utilizing the canal water for their habitational needs.

This canal was built up by British in the year 1874.It has separated from cauvery river at Grand Anicut which lies 60 km. North West of Thanjavur. Most of the lengths of canal are lined up by concrete blocks to

avoid the losses. 26 Branch canals and 63 point sluices are provided in this canal. It is very significant that the drainage water are collected by various drains disturbing the canal water from its head to tail. Many number of cross masonry works were constructed to collect the drainage in successful manner.

This attempt is made to evaluate the quality of G.A. canal water and thereby analyse the correlations between various parameters.

2. MATERIALS AND METHODS

During September 1992- January 1993, 5 sets of (5 samples in each set) water samples have been collected from G.A canal at 6 different locations. The following are the sampling stations.

Sl. No.	Location from G.A. Head	Sampling Station
1.	23 km.	Budhalaur Regulator
2.	42 km.	Thanjavur Regulator
3.	53 km.	Echankkottai Regulator
4.	67 km.	Vettikkadu Regulator
5.	78 km.	Ooranipuram Old Regulator
6.	92Km	Alivalam Regulator

GRAND ANICUT CANAL (MAIN)
DISCHARGE IN CUSECS

Sl. No	**Date**	**Budhalaur regulator**	**Thanjavur regulator**	**Surakkottai regulatar**	**Echankkottai regulator**	**Vettikkadu regulator**	**Alivalam regulator**
1	26.09.92	3855	3004	2303	1757	1591	1090
2	26.10.92	3250	2968	1571	1330	978	658
3	26.11.92	3300	2812	2136	1640	1554	1329
4	26.12.92	3820	3003	2255	1790	1432	1152
5	26.01.93	3083	2874	2212	1789	1368	1168

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3. RESULTS OF EXAMINATION OF WATER SAMPLE

The samples were analyzed for physico - chemical parameters like p^H, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended solids (TSS), Total Hardness (THD) Chlorides (CL) Temperature, Salinity and Turbidity. P^H and E_C were measured by Elico portable water quality analyzer and remaining physico- chemical parameters were determined following standard methods APHA 1980 and IS: 3025-1964. The results of various parameters are shown in the following tables.

P^H	-	Potential Hydrogen ion concentration
EC	-	Electrical conductivity in mhos/cm
TDS	-	Total dissolved solids in ppm (parts per million)
TSS	-	Total suspended solids in ppm
THD	-	Total hardness in ppm
CL	-	Chlorides in ppm
C	-	Salinity in ppm
T^0C	-	Temperature in ^0C
TUR	-	Turbidity in ppm

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STATION: 1

BUDALUR REGULAOR

SL.NO	DATE OF SAMPLING	P^H	EC	TDS	TSS	THD	CL	C	T^0C	TUR
1	26.09.92	6.9	000380	236.8	65.00	175	21.30	50	26	12
2	26.10.92	6.9	.000390	237.8	45.00	150	24.85	50	27	20
3	26.11.92	6.9	.000370	236.8	58.33	150	21.30	50	27	20
4	26.12.92	6.9	.000370	236.8	58.90	150	21.30	50	27	20
5	26.01.93	6.9	.000380	236.6	58.70	150	21.30	50	27	20

STATION: 2

THANJAJVUR REGULATOR

SL.NO	DATE OF SAMPLING	P^H	EC	TDS	TSS	THD	CL	C	T^0C	TUR
1	26.09.92	6.9	.000390	249.6	65.00	200	24.85	50	24	10
2	26.10.92	6.9	000.370	236.8	53.70	150	24.85	50	27	20
3	26.11.92	6.9	.000370	237.2	58.80	125	24.85	50	27	20
4	26.12.92	6.9	.000370	236.8	58.50	150	21.30	50	27	20
5	26.01.93	6.9	.000370	236.4	58.50	150	21.30	50	27	20

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STATION: 3

ECHANKKOTTAI REGULATOR

SL.NO	DATE OF SAMPLING	P^H	EC	TDS	TSS	THD	CL	C	T^0C	TUR
1	26.09.92	6.9	.000380	243.0	72.50	100	24.85	50	24	12
2	26.10.92	6.9	000.380	243.6	44.70	175	24.85	50	27	22
3	26.11.92	6.9	.000380	243.2	59.80	150	21.30	50	27	25
4	26.12.92	6.9	.000380	242.4	48.50	150	21.30	50	27	20
5	26.01.93	6.9	.000380	243.1	48.20	150	21.30	50	27	20

SL.NO	DATE OF SAMPLING	P^H	EC	TDS	TSS	THD	CL	C	T^0C	TUR
1	26.09.92	6.9	.000380	243.0	71.50	125	24.85	50	24	12
2	26.10.92	6.9	000.410	265.0	41.60	175	21.30	50	26	20
3	26.11.92	6.9	.000390	250.8	44.60	125	24.85	50	27	20
4	26.12.92	6.9	.000380	249.2	42.70	125	24.85	50	27	20
5	26.01.93	6.9	.000380	249.3	42.80	125	24.85	50	27	20

STATION: 4

VETTIKKADU REGULATOR

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STATION: 5

SL. NO.	DATE OF SAMPLING	P^H	EC	TDS	TSS	THD	CI	C	T^0C	TUR
1.	26.09.92	6.9	.000390	249.6	076.00	125	24.85	50	24	10
2	26.10.92	6.9	.000390	249.8	052.30	150	21.80	50	27	20
3.	26.11.92	6.9	.000390	249.8	045.80	125	24.85	50	27	20
4.	26.12.92	6.9	.000380	249.9	045.80	150	24.85	50	27	20
5.	26.01.93	6.9	.000380	250.2	045.60	150	24.85	50	27	20

OORANIPURAM OLD REGULATOR

STATION: 6

ALIVALAM REGULATOR

Sl.No.	DATE OF SAMPLING	P^H	EC	TDS	TSS	THD	CI	C	T^0C	TUR
1.	26.09.92	6.9	.000390	250.0	89.00	100	24.85	50	24	12
4.	26.10.92	6.9	.000370	237.2	29.80	175	24.85	50	27	20
3.	26.11.92	6.9	.000390	236.6	58.20	175	21.30	50	27	20
4.	26.12.92	6.9	.000380	242.9	44.20	175	21.30	50	27	20
5.	26.01.93	6.9	.000380	243.0	44.10	175	21.30	50	27	20

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4. RESULTS AND DISCUSSION

The result of this study are presented in TABLES as above, the reported values refer to the average analytical of the water samples collected at different periods. This results indicates that the water quality parameters. Salinity and P^H are mostly same in all locations. Other parameters like EC, TDS, T.S.S, T H D. CL, Temperature, Turbidity are having mild variation from location to location. This is happened only that the rain water stored in the reservoir is admitted to flow through this canal. Contamination of canal water by various discharges are restricted by means of constructions of cross masonry works. Results of all the parameters are mostly within the permissible limit. (Appendix-I) Correlation analysis of water quality parameters were carried out. The correlation co-efficient (r-value) between each pair of parameters are computed and listed in Appendix-II. Sx-Packages was used to compute the correlation co-efficient for all possible linear relationships. All computations were performed in HCL BUSYBEE PC/XT

5. DISCUSSION OF REGRESSION EQUATIONS

After making complete analysis the following regression equations were obtained. This equation is very useful to reduce laboratory works and thus save time and cost

STATION – I –BUDALUR REGULATOR

1. CL = 1.7067 TDS- 382.58
2. TUR = 4.1053t – 91.526
3. THD = $151.92 – 1.6726X10^{-8}$ TDS
4. TDS = $3.0516X10^{-1}$ CL+230.32
5. TDS = 236.80 – $6.0336X10^{-11}$ THD

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STATION – II – THANJAVUR REGULATOR

1. CL = $1.386X110^{-1}$ TDS – 10.598
2. TUR = 4.2537 – 94.254
3. THD = $7.5665 X 10^{-1}$ TDS – 43.094
4. TDS = 1.0958 CL + 215.11
5. TDS = $3.3041 X10^{-2}$ THD + 235.37

STATION – III – ECHANKKOTTAI REGULATOR

1. CL = $71.403-2.0058X10^{-1}$ TDS
2. TUR = 3.2373t- 65.085
3. THD = $7.8595 X10^{-1}$ TDS – 41.822
4. TDS = $261.80 -8.7995 X10^{-1}$ CL
5. TDS = $3.2444X10^{-2}$ THD + 236.81

STATION – IV – VETTIKKADU REGULATOR

1. CL = $1.8846X10^{-2}$ TDS +19.30
2. TUR = 2.8684t – 57.237
3. THD = 1.1372 TDS – 145.01
4. TDS = $7.0329 X 10^{-1}$ CL + 234.05
5. TDS = $2.7904 X 10^{-1}$ THD + 211.78

STATION – V – OORANIPURAM OLD REGULATOR

1. CL = $2X 10^{-1}$ TDS - 25.673
2. TUR = 3.25T -68
3. THD = 737.71- 2.3617 TDS
4. TDS = $5.2842X10^{-1}$ CL + 236.11
5. TDS = $257.85 – 6X10^{-2}$ THD

STATION – VI – ALIVALAM REGULATOR

1. CL = $4.42 X 10^{-2}$ TDS +12.204
2. TUR = 1.6479t- 23.366

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3. THD = 831.63×10^{-1} - 2.7536 TDS
4. TDS = 2.2468×10^{-1} Cl +237.50
5. TDS = $258.79 - 9.87 \times 10^{-2}$ THD

The larger numerical value of the correlation ($r \rightarrow 1$), the greater is the extent to which correlation holds between the two variables. These relationships are characteristics of G.A. Canal water in Cauvery River. When making relation with other quality parameters such as Ec. Temp. TDS are easily determinable. Hence knowing the TDS, Ec. Temp values one can easily be determined the other significant parameters like THD, CL and TURBIDITY without sparing more time and cost in the experimental analyses of these parameters. The present correlations are therefore of predictive nature and will go a long way in assessing the quality of running water

6. REFERENCES

[1] C. Prabhahar, "Seasonal Variation in Physico-Chemical Parameters of Palar River in and Around Vaniyambadi Segment, Vellore District, Tamil Nadu, India," *International Journal of Pharmaceutical & Biological Archive,* vol. 3, 1991

[2] J. Naumczyk and M. Rusiniak, "Physicochemical and chemical purification of tannery wastewaters," *Polish journal of environmental studies*, vol. 14, pp. 789-797, 1992

[3] E. Ates, D. Orhon, and O. Tünay, "Characterization of tannery wastewaters for pretreatment selected case studies," *Water Science and Technology*, vol. 36, pp. 217-223, 1997.

[4] Z. Song, C. Williams, and R. Edyvean, "Treatment of tannery wastewater by chemical coagulation," *Desalination*, vol. 164, pp. 249-259, 2004.

[5] S. Krishanamoorthi, V. Sivakumar, K. Saravanan, and T. S. Prabhu, "Treatment and reuse of tannery waste water by embedded system," *Modern Applied Science,* vol. 3, p. 129, 200