
Augmentation of Correlation Analysis on Physico - Chemical Characteristics of Grand Anicut Canal of Cauvery River

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Running water have been collected at 10 different 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, Ec, T.D.S, T.S.S.TH, 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: PHYSICO, CHEMICAL, 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 mobilise 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, 13 sets of (10 samples in each set) water samples have been collected from G.A canal at 10 different locations. The following are the sampling stations.

Sl. No.	Location from G.A. Head	Sampling Station
1.	37 km.	Srinivasapuram of Thanjavur
2.	42 km.	River bridge of Thanjavur
3.	47 km.	Thanjavur Regulator
4.	52 km.	Surakkottai Regulator
5.	57 km.	Kovilur Road Bridge
6.	62 km.	Echankottai Regulator
7.	67 km.	Chellampatti Canal Drop
8.	72 km.	Karukkupatti Canal Drop
9.	77 km.	Vettikadu Aqueduct
10.	82 km.	Ooranipuram Old Regulator

GRAND ANICUT CANAL (MAIN) DISCHARGE IN CUSECS

Sl. No	Date	Budhalaur regulator	Thanjavur regulator	Surakkottai regulator	Echankottai regulator	Vettikkadu regulator	Alivalam regulator
1	26.09.92	3855	3004	2303	1757	1591	1090
2	06.10.92	2507	2360	1465	1322	1042	992
3	16.10.92	3048	2798	1818	1485	1201	1002
4	26.10.92	3250	2968	1571	1330	978	658
5	06.11.92	3300	2812	2136	1640	1554	1329
6	16.11.92	85	483	335	190	40	18
7	26.11.92	1042	482	327	15 (Leakage)	25	8
8	06.12.92	1854	1687	1062	864	597	428
9	16.12.92	2762	2542	2004	1827	1728	1368
10	26.12.92	3820	3003	2255	1790	1432	1152
11	06.01.93	3828	3085	2191	1791	1388	1076
12	16.01.93	3847	2958	2204	1802	1464	1217
13	26.01.93	3083	2874	2212	1789	1368	1168

GRAND ANICUT CANAL (BRANCHES)
DISCHARGE IN CUSECS

DATE	NEIVASAL THENPATHY CHANNEL	VATTACHERI CHANNEL	K.B. HEAD REGULATOR	G.A.16	G.A.7	G.A.S	R.B. HEAD REGULATOR	G.A.S	OLAVAYAL CHANNEL
26.09.92	91	82	520	24	21	13	489	32	89
06.10.92	89	82	719	12	08	04	117	38	59
16.10.92	92	84	801	18	11	06	298	37	76
26.10.92	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
06.11.92	74	70	533	22	16	09	451	NIL	89
16.11.92	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
26.11.92	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
06.12.92	90	58	476	19	14	06	157	37	82
16.12.92	40	55	429	14	09	03	150	01	91
26.12.92	86	83	580	24	18	03	420	41	96
06.01.93	96	87	607	22	18	04	359	43	94
16.01.93	71	64	618	22	18	04	358	44	92
26.01.93	41	20	601	24	16	08	375	43	91

Contd
GRAND ANICUT CANAL (BRANCHES)
DISCHARGE IN CUSECS

DATE	R.CH	G.A.11	SILLATHUR CHANNEL	KILANAGADU CHEANNEL	G.A.13	ALIVALAM CHANNEL
26.09.92	02	11	32	44	29	99
06.10.92	04	19	40	02	01	46
16.10.92	04	21	42	46	27	97
26.10.92	NIL	NIL	NIL	NIL	NIL	NIL
06.11.92	NIL	NIL	NIL	45	27	98
16.11.92	NIL	NIL	NIL	NIL	NIL	NIL
26.11.92	NIL	NIL	NIL	NIL	NIL	NIL
06.12.92	06	22	42	44	29	96
16.12.92	08	24	44	46	26	99
26.12.92	01	01	04	46	31	99
06.01.93	08	27	44	45	29	97
16.01.93	07	28	44	44	29	98
26.01.93	07	26	43	46	27	97

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
 $T^{\circ}C$ - Temperature in $^{\circ}C$
 TUR - Turbidity in ppm

STATION: 1

SRINIVASAPURAM OF THANJAVUR

SL.NO	DATE OF SAMPLING	P^H	EC	TDS	TSS	THD	CL	C	$T^{\circ}C$	TUR
1	26.09.92	6.9	000380	236.8	65.00	175	21.30	50	26	12
2	06.10.92	6.9	.000370	237.0	67.00	150	21.30	50	26	15
3	16.10.92	6.9	.000370	237.2	51.00	150	21.30	50	28	20
4	26.10.92	6.9	.000390	237.8	45.00	150	24.85	50	27	20
5	06.11.92	6.9	.000370	236.8	58.33	150	21.30	50	27	20
6	16.11.92	6.9	.000370	236.8	58.90	150	21.30	50	27	20
7	26.11.92	6.9	.000370	236.8	58.70	150	21.30	50	27	20
8	06.12.92	6.9	.000370	236.0	58.40	150	21.30	50	27	20
9	16.12.92	6.9	.000370	236.4	58.60	150	21.30	50	27	20
10	26.12.92	6.9	.000370	236.8	58.90	150	21.30	50	27	20
11	06.01.93	6.9	.000370	236.8	58.70	150	21.30	50	27	20
12	16.01.93	6.9	.000370	236.6	58.80	150	21.30	50	27	20
13	26.01.93	6.9	.000380	236.6	58.70	150	21.30	50	27	20

STATION: 2
RIVER BRIDGE OF THANJAJVUR

SL.NO	DATE OF SAMPLING	PH	EC	TDS	TSS	THD	CL	C	T°C	TUR
1	26.09.92	6.9	.000390	249.6	65.00	200	24.85	50	24	10
2	06.10.92	6.9	.000390	250.2	74.00	100	24.85	50	26	15
3	16.10.92	6.9	.000380	243.2	47.50	125	21.30	50	28	30
4	26.10.92	6.9	000.370	236.8	53.70	150	24.85	50	27	20
5	06.11.92	6.9	.000370	237.2	58.80	125	24.85	50	27	20
6	16.11.92	6.9	.000370	237.2	60.00	125	21.30	50	27	20
7	26.11.92	6.9	.000380	243.8	58.80	150	21.30	50	27	20
8	06.12.92	6.9	.000380	237.9	58.80	125	24.85	50	27	20
9	16.12.92	6.9	.000370	237.0	58.10	125	21.30	50	27	20
10	26.12.92	6.9	.000370	236.8	58.50	150	21.30	50	27	20
11	06.01.92	6.9	.000370	235.6	58.60	150	21.30	50	27	20
12	16.01.93	6.9	.000370	236.7	58.40	125	21.30	50	27	20
13	26.01.93	6.9	.000370	236.4	58.50	150	21.30	50	27	20

STATION: 3
THANJAVUR REGULATOR

SL.NO	DATE OF SAMPLING	P ^H	EC	TDS	TSS	THD	CL	C	T ⁰ C	TUR
1	26.09.92	6.9	.000380	243.0	72.50	100	24.85	50	24	12
2	06.10.92	6.9	.000350	230.2	71.80	150	24.85	50	26	15
3	16.10.92	6.9	.000380	243.2	36.00	175	24.85	50	27	30
4	26.10.92	6.9	000.380	243.6	44.70	175	24.85	50	27	22
5	06.11.92	6.9	.000370	236.8	62.20	125	24.85	50	26	25
6	16.11.92	6.9	.000380	243.2	51.90	150	21.30	50	27	20
7	26.11.92	6.9	.000380	243.2	59.80	150	21.30	50	27	25
8	06.12.92	6.9	.000370	242.8	38.00	150	24.85	50	27	25
9	16.12.92	6.9	.000380	243.6	44.70	150	21.30	50	27	20
10	26.12.92	6.9	.000380	242.4	48.50	150	21.30	50	27	20
11	06.01.92	6.9	.000380	242.9	47.90	150	21.30	50	27	20
12	16.01.93	6.9	.000380	243.0	48.30	150	21.30	50	27	20
13	26.01.93	6.9	.000380	243.1	48.20	150	21.30	50	27	20

STATION: 4
SURAKKOTTAI REGULATOR

SL.NO	DATE OF SAMPLING	P ^H	EC	TDS	TSS	THD	CL	C	T ^o C	TUR
1	26.09.92	6.9	.000380	243.0	71.50	125	24.85	50	24	12
2	06.10.92	6.9	.000360	230.5	74.50	150	21.30	50	27	15
3	16.10.92	6.9	.000420	270.0	32.50	175	24.85	50	28	30
4	26.10.92	6.9	000.410	265.0	41.60	175	21.30	50	26	20
5	06.11.92	6.9	.000400	256.0	45.60	150	24.85	50	27	20
6	16.11.92	6.9	.000390	251.6	45.20	150	21.30	50	27	20
7	26.11.92	6.9	.000390	250.8	44.60	125	24.85	50	27	20
8	06.12.92	6.9	.000380	248.9	43.20	150	24.85	50	28	20
9	16.12.92	6.9	.000380	249.6	43.90	125	24.85	50	27	20
10	26.12.92	6.9	.000380	249.2	42.70	125	24.85	50	27	20
11	06.01.92	6.9	.000380	249.4	42.50	125	24.85	50	27	20
12	16.01.93	6.9	.000380	249.1	42.70	125	24.85	50	27	20
13	26.01.93	6.9	.000380	249.3	42.80	125	24.85	50	27	20

STATION: 5
KOVILUR ROAD BRIDGE

Sl. No.	DATE OF SAMPLING	P ^H	EC	TDS	TSS	THD	CL	C	T ⁰ C	TUR
1.	26.09.92	6.9	.000380	243.2	77.00	075	28.40	50	25	12
2.	06.10.92	6.9	.000360	230.2	82.00	150	21.30	50	27	15
3.	16.10.92	6.9	.000390	249.6	29.50	150	24.85	50	27	15
4.	26.10.92	6.9	.000370	236.8	32.60	150	21.30	50	27	15
5.	06.11.92	6.9	.000370	237.2	44.30	150	24.85	50	27	15
6.	16.11.92	6.9	.000370	236.6	45.10	150	24.85	50	27	20
7.	26.11.92	6.9	.000370	236.8	44.90	150	24.85	50	27	15
8.	06.12.92	6.9	.000370	235.9	44.80	150	24.85	50	27	15
9.	16.12.92	6.9	.000370	236.2	44.20	150	24.85	50	27	15
10.	26.12.92	6.9	.000370	236.0	44.80	150	24.85	50	27	20
11.	06.01.93	6.9	.000370	236.1	44.50	150	24.85	50	27	20
12.	16.01.93	6.9	.000370	236.2	44.60	150	24.85	50	27	15
13.	26.01.93	6.9	.000370	236.0	44.70	150	24.85	50	27	20

STATION: 6
ECHANKOTTAI REGULATOR

Sl. No.	DATE OF SAMPLING	pH	EC	TDS	TSS	THD	CL	C	T ⁰ C	TUR
1.	26.09.92	6.9	.000390	249.0	117.00	100	24.85	50	24	18
2.	06.10.92	6.9	.000380	244.2	105.00	150	21.30	50	27	15
3.	16.10.92	6.9	.000400	256.0	030.20	150	21.30	50	27	20
4.	26.10.92	6.9	.000390	250.4	035.40	150	21.30	50	27	20
5.	06.11.92	6.9	.000390	250.2	042.30	150	21.30	50	27	20
6.	16.11.92	6.9	.000390	249.8	045.10	150	21.30	50	27	20
7.	26.11.92	6.9	.000380	243.2	046.80	150	21.30	50	27	20
8.	06.12.92	6.9	.000380	244.4	046.40	150	21.30	50	27	20
9.	16.12.92	6.9	.000380	244.0	046.20	150	21.30	50	27	20
10.	26.12.92	6.9	.000380	244.2	046.40	150	21.30	50	27	20
11.	06.01.93	6.9	.000370	244.0	046.40	150	21.30	50	27	20
12.	16.01.93	6.9	.000370	244.1	046.30	150	21.30	50	27	20
13.	26.01.93	6.9	.000370	244.2	046.40	150	21.30	50	27	20

STATION: 7
CHELLAMPATTI CANAL DROP

SL. NO.	Date of sampling	P ^H	EC	TDS	TSS	THD	CL	C	T ⁰ C	TUR
1.	26.09.92	6.9	.000390	249.6	74.00	100	28.40	50	24	15
2.	06.10.92	6.9	.000380	243.4	58.00	175	21.30	50	26	15
3.	16.10.92	6.9	.000410	262.4	32.90	175	24.85	50	28	20
4.	26.10.92	6.9	.000400	256.2	35.60	175	24.85	50	26	20
5.	06.11.92	6.9	.000410	261.8	45.70	150	24.85	50	27	20
6.	16.11.92	6.9	.000400	256.0	44.90	150	24.85	50	27	20
7.	26.11.92	6.9	.000390	249.6	45.30	175	21.30	50	27	20
8.	06.12.92	6.9	.000390	249.9	45.40	150	21.30	50	27	20
9.	16.12.92	6.9	.000390	249.5	45.20	150	24.85	50	27	20
10.	26.12.92	6.9	.000390	249.7	45.80	150	21.30	50	27	20
11.	06.01.93	6.9	.000390	249.6	45.80	150	21.30	50	27	20
12.	16.01.93	6.9	.000390	249.7	45.60	150	24.85	50	27	20
13.	26.01.93	6.9	.000390	249.7	45.50	150	24.85	50	27	20

STATION: 8
KARUKKUPATTI CANAL DROP

Sl. NO.	DATE OF SAMPLING	p ^H	EC	TDS	TSS	THD	EC	C	T ^o C	TUR
1.	26.09.92	6.9	.000390	249.6	74.00	125	24.85	50	24	12
2.	06.10.92	6.9	.000370	236.8	69.00	175	21.30	50	26	15
3.	16.10.92	6.9	.000380	243.4	35.50	175	28.40	50	27	20
4.	26.10.92	6.9	.000370	236.6	40.20	150	24.85	50	27	20
5.	06.11.92	6.9	.000370	236.6	44.40	175	21.30	50	27	20
6.	16.11.92	6.9	.000370	236.8	44.40	175	21.30	50	27	20
7.	26.11.92	6.9	.000370	237.0	43.90	150	21.30	50	27	20
8.	06.12.92	6.9	.000370	236.9	43.70	175	21.30	50	27	20
9.	16.12.92	6.9	.000370	237.2	43.80	175	21.30	50	27	20
10.	26.12.92	6.9	.000370	237.3	44.10	150	21.30	50	27	20
11.	06.01.93	6.9	.000370	237.2	44.00	175	21.30	50	27	20
12.	16.01.93	6.9	.000370	237.2	44.20	175	21.30	50	27	20
13.	26.01.93	6.9	.000370	237.0	44.30	175	21.30	50	27	20

STATION: 9
VETTIKADU AQUEDUCT

SL. NO.	DATE OF SAMPLING	PH	EC	TDS	TSS	THD	CI	C	T ⁰ C	TUR
1.	26.09.92	6.9	.000390	249.6	076.00	125	24.85	50	24	10
2.	06.10.92	6.9	.000380	243.8	102.50	175	21.30	50	27	15
3.	16.10.92	6.9	.000390	250.2	038.80	150	24.85	50	27	22
4.	26.10.92	6.9	.000390	249.8	052.30	150	21.80	50	27	20
5.	06.11.92	6.9	.000390	249.6	045.80	175	21.80	50	27	20
6.	16.11.92	6.9	.000380	243.6	045.80	150	24.85	50	27	20
7.	26.11.92	6.9	.000390	249.8	045.80	125	24.85	50	27	20
8.	06.12.92	6.9	.000380	249.2	045.40	150	24.85	50	27	20
9.	16.12.92	6.9	.000380	249.5	045.60	150	24.85	50	27	20
10.	26.12.92	6.9	.000380	249.9	045.80	150	24.85	50	27	20
11.	06.01.93	6.9	.000380	249.8	045.60	150	24.85	50	27	20
12.	06.01.93	6.9	.000380	250.0	045.70	150	24.85	50	27	20
13.	26.01.93	6.9	.000380	250.2	045.60	150	24.85	50	27	20

STATION: 10
OORANIPURAM OLD REGULATOR

Sl. No.	DATE OF SAMPLING	pH	EC	TDS	TSS	THD	CI	C	T ⁰ C	TUR
1.	26.09.92	6.9	.000390	250.0	89.00	100	24.85	50	24	12
2.	06.10.92	6.9	.000370	236.8	97.60	175	24.85	50	28	15
3.	16.10.92	6.9	.000390	249.6	31.20	175	24.85	50	28	20
4.	26.10.92	6.9	.000370	237.2	29.80	175	24.85	50	27	20
5.	06.11.92	6.9	.000380	243.2	45.10	150	24.85	50	27	20
6.	16.11.92	6.9	.000380	243.8	44.20	150	21.30	50	27	20
7.	26.11.92	6.9	.000390	236.6	58.20	175	21.30	50	27	20
8.	06.12.92	6.9	.000390	241.7	40.90	150	24.85	50	27	20
9.	16.12.92	6.9	.000380	243.6	44.40	175	21.30	50	27	20
10.	26.12.92	6.9	.000380	242.9	44.20	175	21.30	50	27	20
11.	06.01.93	6.9	.000380	243.0	44.20	175	21.30	50	27	20
12.	06.01.93	6.9	.000380	243.1	44.10	175	21.30	50	27	20
13.	26.01.93	6.9	.000380	243.0	44.10	175	21.30	50	27	20

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 – SRINIVASAPURM OF THANJAVUR

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

STATION – II – RIVER BRIDGE OF THANJAVUR

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 – THANJAVUR 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 – SURAKKOTTAI 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 - KOVILUR ROAD BRIDGE

1. CL = 1.9658 X 10⁻¹ TDS – 22.100
2. TUR = 2.333t – 46.333
3. THD = 560.03- 1.7611 TDS
4. TDS = 1.3150 CL + 205.13
5. TDS = 249.33 – 8.311 X 10⁻² THD

STATION – VI – ECHANKOTTAI REGULATOR

1. CL = 4.3265 X10⁻² TDS +10.898
2. TUR = 5.2778 X 10⁻¹ t + 5.3333
3. THD = 316.27 -7.504 X10⁻¹ TDS
4. TDS = 6.8779X10⁻¹ CL + 231.91
5. TDS = 252.97 - 4.3742 X10⁻¹ THD

STATION – VII – CHELLAMPATTI CANAL DROP

1. CL = 1.5716X10⁻¹ TDS – 15.859

2. TUR = 1.57141-22.714
3. THD = 5.7879X10⁻¹ TDS + 7.9424
4. TDS = 9.2958 X 10⁻¹ CL + 230
5. TDS = 4.280 X 10⁻² THD + 245.50

STATION – VIII - KARUKKUPATTI CANAL DROP

1. CL = 3.9391X10⁻¹¹ TDS – 71.528
2. TUR = 2.8509t – 57.096
3. THD = 781.13 – 2.5825 TDS
4. TDS = 1.1385 CL + 212.94
5. TDS = 261.82 -1.4139 X 10⁻¹ THD

STATION – IX - VETTIKADU AQUEDUCT

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 – X – OORANIPURAM OLD REGULATOR

1. CL = 4.42 X 10⁻² TDS +12.204
2. TUR = 1.6479t- 23.366
3. THD = 831.63 x10⁻¹ - 2.7536 TDS
4. TDS = 2.2468x10⁻¹ Cl +237.50
5. TDS = 258.79 – 9.87X10⁻² THD

The larger numerical value of the correlation (r→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.

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APPENDIX –I

SUMMARY STATISTICS TABLE INDICATING THE NINE WATER QUALITY VARIABLES

(Permissible standards)

Sl. No.	Variable	Mean	Minimum	Maximum	Maximum permissible limit		
					Domestic	Irrigation	Industry
1.	pH	6.9	6.9	6.9	6.5-8.0	6.5-9.20	6.5-8.0
2.	Ec (UC.mhos/cm)	0.00038	0.00036	0.00042	-	3000	-
3.	TDS (ppm)	243.60	230.20	270.0	500-1000	2100	2000
4.	TSS (ppm)	51.53	29.50	117.0	30	30	30
5.	THD (ppm)	149.80	75.0	200.0	250	600	600
6.	CL (ppm)	23.06	21.30	28.40	250	600	20
7.	Sali (ppm)	50.0	50.0	50.0	100	-	100
8.	Temp °c	26.78	24.0	28.0	18 ⁰ -25 ⁰ C	25 ⁰	-
9.	Turbidity (ppm)	19.15	10.0	30.0	5-10	-	-

APPENDIX – II
CORELATION CO-EFFICIENT TABLES
STATION - I
TABLE – 1

Parameters	pH	EC	TDS	TSS	TEMP	CL	SALI	TEMP	TUR
pH	1.0000								
EC	M	1.0000							
TDS	-0.5048	0.5715	1.0000						
TSS	0.0648	-0.4619	-0.5491	1.0000					
THD	-0.3092	0.3300	-0.0000	0.3797	1.00000				
CL	-0.2425	0.8066	0.7217	-0.7298	-0.0833	1.0000			
SALI	M	M	-0.4741	0.0484	-0.3276	-0.2269	1.0000		
TEMP	0.1738	-0.1854	0.0811	-0.7121	-0.5620	0.0468	0.1841	1.000	
TUR	0.4431	-0.2101	-0.0795	-0.6051	-0.8357	0.1194	0.4694	0.8051	1.000

An “M” is displayed when a co-efficient cannot be computed.

STATION – II
TABLE – 2

Parameters	p ^H	EC	TDS	TSS	THD	CL	SALI	TEMP	TUR
p ^H	1.0000								
EC	M	1.0000							
TDS	-0.6008	0.9533	1.0000						
TSS	-0.1254	0.5270	0.5485	1.0000					
THD	0.0210	0.1366	0.1581	-0.0698	1.0000				
CL	-0.5435	0.4892	0.3897	0.4055	0.0523	1.0000			
SALI	M	M	-0.6331	-0.1354	0.0364	-0.5578	1.0000		
TEMP	0.2776	-0.6237	-0.6398	-0.6671	-0.5934	-0.5054	0.2941	1.0000	
TUR	0.0995	-0.4309	-0.4408	-0.8107	-0.4457	0.4991	0.1054	0.9144	1.0000

An “M” is displayed when a co-efficient cannot be computed.

STATION – III
TABLE – 3

Parameters	p ^H	EC	TDS	TSS	THD	CL	SALI	TEMP	TUR
p ^H	1.0000								
EC	M	1.0000							
TDS	0.3653	0.9066	1.0000						
TSS	-0.3936	-0.4160	-0.6079	1.0000					
THD	0.1068	0.1205	0.1597	-0.7106	1.0000				
CL	-0.6957	-0.5487	-0.4201	0.1937	-0.1139	1.0000			
SALI	M	M	0.3686	-0.3885	0.1104	-0.7195	1.0000		
TEMP	0.4665	0.2221	0.2999	-0.7658	0.8345	-0.4972	0.4822	1.0000	
TUR	-0.0333	0.1240	0.2615	-0.6554	0.5754	0.0888	-0.0285	0.6133	1.0000

An “M” is displayed when a co-efficient cannot be computed.

STATION – IV
TABLE – 4

Parameters	P ^H	E _c	TDS	TSS	THD	CL	SALI	TEMP	TUR
P ^H	1.0000								
E _c	M	1.0000							
TDS	- 0.1349	0.9610	1.0000						
TSS	- 0.3821	- 0.6221	- 0.7907	1.0000					
THD	- 0.6343	0.6631	0.5633	- 0.1886	1.0000				
CL	0.4833	0.0094	0.1151	- 0.3151	- 0.5330	1.0000			
SALI	M	M	- 0.1184	- 0.4017	- 0.6336	0.4655	1.0000		
TEMP	0.2685	0.1300	0.2380	- 0.6094	0.2452	0.1037	0.2662	1.0000	
TUR	0.0650	0.7075	0.7883	-8434	0.4615	0.2066	0.0688	0.7148	1.0000

An “M” is displayed when a co-efficient cannot be computed.

STATION – V

Parameters	p ^H	E _c	TDS	TSS	THD	CI	SALI	TEMP	TUR
p ^H	1.0000								
E _c	M	1.0000							
TDS	- 0.3153	0.9961	1.0000						
TSS	- 0.2606	- 0.3389	- 0.3213	1.0000					
THD	0.3092	- 0.3691	- 0.3815	- 0.5849	1.0000				
CI	0.1363	0.5280	0.5084	0.1167	- 0.6556	1.0000			
SALI	M	M	0.3288	- 0.2822	0.3276	0.1275	1.0000		
TEMP	0.3092	- 0.3691	- 0.3815	- 0.5849	1.0000	- 0.6556	0.3276	1.0000	
TUR	0.5028	- 0.2527	- 0.2919	- 0.3116	0.4813	- 0.1063	0.5612	0.4813	1.0000

TABLE - 5

An “M” is displayed when a co-efficient cannot be computed.

STATION – VI

TABLE – 6

Parameters	p ^H	EC	TDS	TSS	THD	CL	SALI	TEMP	TUR
p ^H	1.0000								
EC	M	1.0000							
TDS	-0.6514	0.8905	1.0000						
TSS	-0.3328	0.0228	-0.1625	1.0000					
THD	-0.3240	-0.3193	-0.1756	-0.5604	1.0000				
CL	-0.3092	0.2576	0.1725	0.7304	-0.8066	1.0000			
SALI	M	M	-0.6438	-0.3581	0.3393	-0.3276	1.0000		
TEMP	0.3092	-0.2576	-0.1725	-0.7304	0.8066	-1.0000	0.3276	1.0000	
TUR	0.4141	-0.0537	0.1204	-0.8452	0.1683	-0.3028	0.4386	0.3028	1.0000

An “M” is displayed when a co-efficient cannot be computed.

STATION – VII

TABLE – 7

Parameters	p ^H	EC	TDS	TSS	THD	CL	SALI	TEMP	TUR
p ^H	1.0000								
EC	M	1.0000							
TDS	-0.3884	0.9995	1.0000						
TSS	-0.1708	0.5250	-0.5368	1.0000					
THD	-0.1074	0.1473	0.1574	-0.7284	1.0000				
CL	-0.2084	0.3858	0.3822	0.2815	-0.5588	1.000			
SALI	M	M	-0.3644	0.1891	-0.1008	0.2273	1.0000		
TEMP	0.3426	0.3579	0.3610	-0.8364	0.6170	-0.4508	0.3542	1.0000	
TUR	0.4568	0.4514	0.4554	-0.8475	0.3624	-0.2166	0.4839	0.7928	1.0000

An “M” is displayed when a co-efficient cannot be computed.

STATION – VIII
TABLE – 8

Parameters	p ^H	EC	TDS	TSS	THD	CL	SALI	TEMP	TUR
p ^H	1.0000								
EC	M	1.0000							
TDS	-0.3915	0.9982	1.0000						
TSS	-0.3364	0.5216	0.5105	1.0000					
THD	0.3221	-0.6086	-0.6043	-0.4574	1.0000				
CL	-0.5148	0.6788	0.6697	-0.0500	-0.2970	1.0000			
SALI	M	M	-0.4175	-0.3584	0.3022	-0.5322	1.0000		
TEMP	0.4013	-0.8260	-0.8167	-0.8960	0.6687	-0.2736	0.4252	1.0000	
TUR	0.4431	-0.7185	-0.7067	-0.9629	0.5600	-0.2101	0.4694	0.9684	1.0000

An “M” is displayed when a co-efficient cannot be computed

STATION - IX
TABLE – 9

Parameters	p ^H	EC	TDS	TSS	THD	CL	SALI	TEMP	TUR
p ^H	1.0000								
EC	M	1.0000							
TDS	0.4082	0.3412	1.0000						
TSS	-0.4219	-0.0293	-0.5549	1.0000					
THD	-0.0759	-0.2850	-0.3764	0.2191	1.0000				
CL	0.4949	-0.2777	0.3251	-0.5320	-0.6730	1.0000			
SALI	M	M	0.4010	-0.4433	-0.0661	0.4840	1.0000		
TEMP	0.3092	-0.3651	-0.0985	-0.4068	0.5204	-0.1576	0.3276	1.0000	
TUR	0.3586	-0.1588	0.2377	-0.7893	0.2321	0.1534	0.3799	0.8698	1.0000

An “M” is displayed when a co-efficient cannot be computed.

STATION – X

TABLE – 10

Parameters	p ^H	EC	TDS	TSS	THD	CL	SALI	TEMP	TUR
p ^H	1.0000								
EC	M	1.0000							
TDS	-0.0453	0.5419	1.0000						
TSS	-0.3341	-0.0548	-0.0756	1.0000					
THD	0.4021	-0.4245	-0.5213	-0.4409	1.0000				
CL	-0.6957	0.0179	0.0997	0.2409	-0.4085	1.0000			
SALI	M	M	-0.0594	-0.3563	0.4113	-0.7195	1.0000		
TEMP	0.0899	-0.3609	-0.4407	-0.3781	0.8503	-0.0906	0.0952	1.0000	
TUR	0.4431	-0.0481	-0.2353	-0.8880	0.6796	-0.4467	0.4694	0.6247	1.0000

An “M” is displayed when a co-efficient cannot be computed.