Correlation Study among Physico-Chemical and Biological Characteristics of Karanja Reservoir

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Abstract: **The Karanja Reservoir is one of the major drinking water sources for the Bidar district is under threat by the disposal of effluents from the industries such as Sugar, Paper and distilleries. To study the effect of effluent disposal on this reservoir, correlation study among physico chemical and Biological characteristics of reservoir where carried out. It is observed that the distribution of TDS, TSS, EC, Cl, TH, Mg, DO, BOD, COD, NH_4-N, TKN, OP, DP TC and acidity were significantly correlated (r > 0.4) with total solids (TS) in most of the sampling points. Hence, in the present study the correlation between total solids with other variables is discussed in detail.**

Keywords: **Karanja reservoir, Correltion, Physico-chemical and Biological**

I. INTRODUCTION

Water is the most essential and precious one, it is universal solvent nature has provided to all forms of life on the earth. It is an important component of our environment and is being continuously polluted all over the world. Water is an essential requirement of human and industrial development and it is one of the most delicate parts of the environment. In the last few decades there has been a tremendous increase in the demand for fresh water, because the water pollution is increasing like anything. Important surface water sources are lakes, ponds, reservoirs and rivers; these sources play an important role in overall development programs, as a source of water supply for domestic, industrial, fishery, agriculture and also recreational purpose. However, the same water sources are also utilized for the disposal of industrial wastes and sewage, leading to water pollution. Water is essential for life and thus the quality of water is an important measures of the quality of life or rather the existence of life. Consequently, water quality management is one of the most important activities of mankind, to protect and save human life and the life of other living things. The management of water quality, or the protection of the aquatic ecosystem in a broader sense, means the control of pollution [1,2].

The degree of linear association between any two of the water quality parameters is measured by the Karl Pearson's correlation coefficient 'r' for the physico-chemical and biological characteristics for reservoir water sample. A few of the studied variables in the reservoir are highly correlated; these relationships may differ from station to station because of the climate as well as topography and the extent of the pollution load added to the reservoir system. The different water quality parameters displays inter dependencies which are studied with the help of correlation studies. For the reservoir water, different variable correlation coefficients 'r' were worked out and depicted in correlation matrix tables. The value of correlation coefficient more than + or – 0.40 were considered as significant (using 't' test). [3].

The present study is aimed to suggest some effective measures for the Karanja reservoir water quality management with the help of correlation study among physic chemical and biological parameters. The objective of the present research is to provide information on the phsico-chemical characteristics corelation of the reservoir Karanja in order to predict the impacts of unregulated waste discharge on the quality of the reservoir. [4].

II. STUDY AREA

The Karanja reservoir is one of the main source of water to Bidar district. It originates near Kohir village of Andhra Pradesh state of India and half of Bidar district joins another tributary of Godavari i.e. Manjera river at 122 km downstream. This reservoir has a dam called Karanja which in near Bhyalhalli village. Fig.1 shows the study area, which has spread between N 17^o 49^l, E 77^o 20^l and N 18^o 02^l, E 77^o 12 with an altitude of 554-575m above MSL.

III. SAMPLING POINTS IN RESERVOIR

Sampling point D-1: This point is approximately 2 kilometers up-stream of the Karanja reservoir near Hilalpur village. Important aspect of this station is that it is the first sampling station just before the discharge of industrial wastewater into the reservoir.

Sampling point D-2: This point is on the left side of the reservoir near Humanabad intake point.

Sampling point D-3: This sampling point is on the right side of the reservoir near tank bund.

Sampling point D-4: This point is opposite the industrial effluent disposal point near Sangolagi village.

Sampling point D-5: This sampling point is located up-stream to the right side where the flow enters the reservoir from Zahirabad.

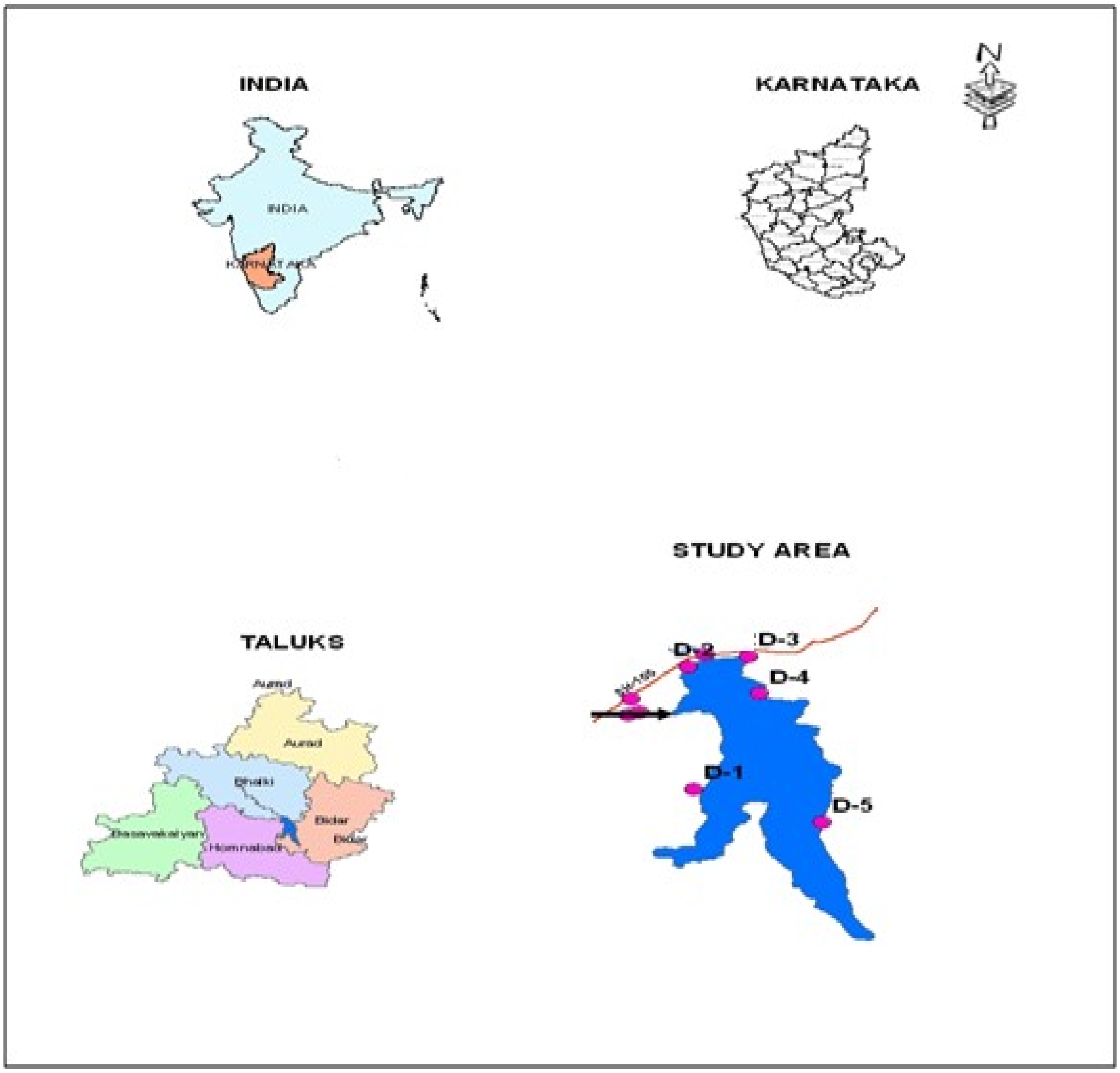

Figure.1 Location map of the study area

IV. RESULT AND DISCUSSION

It is observed that the distribution of total dissolved solids (TDS), total suspended solids (TSS), electrical conductivity (EC), acidity (Ac), chloride (Cl), total hardness (TH), magnesium hardness (Mg), dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), ammonia nitrogen (NH_4-N), total kjeldhal nitrogen (TKN), organic phosphorous (OP), dissolved phosphorous (DP) and total coliforms (TC) were significantly correlated ($r > 0.4$) with total solids (TS) in most of the sampling points. Hence, in the present study the correlation between total solids with other variables is discussed in detail.

At sampling point D-1, it was observed that the correlation between TS and other physico-chemical and biological characteristics is significantly positive for TDS, TSS, EC, NH_4-N and TKN, whereas Cl, TH, Mg, and TC is significantly negative as shown in Table 1. For the sampling point D-1, the highest correlation coefficient 'r' value between TS and TSS was 0.94 and the coefficient of determination (r^2) value was 0.88; this indicated that 88 % of the variability in TS could be ascribed to the variable TSS concentration in the water. The lowest correlation coefficient 'r' value between TS and TKN was 0.47 and the coefficient of determination (r^2) value was 0.22, this indicated that 22 % of the variability in TS could be ascribed to the variable TKN concentration in water. Similarly, in the positively significant correlation coefficients 28 % of the variability in TS could be due to TDS, 23 % of the variability in TS could be due to EC, 42 % of the variability in TS could be due to AN. In the negatively significant correlation coefficient 18 % of the variability in TS could be due to Cl, 18 % of the variability in TS could be due to TH, 21 % of the variability in TS could be due to MH, 43.5 % of the variability in TS could be due to TC.

At sampling point D-2, the correlation between TS and other water quality parameters is significantly positive for TDS, TSS, EC, DO, and negatively significant with Cl, Mg, BOD, NO_3-N and TC as shown in Table 2. The highest correlation 'r' value between TS and TSS was 0.97 and the coefficient of determination (r^2) value was 0.94. This indicated that 94 % of the variability in TS could be ascribed to the variable TSS concentration in the water. The lowest correlation coefficient 'r' value between TS and EC was 0.41 and the coefficient of determination (r^2) value was 0.17. This indicated that 17 % of the variability in TS could be ascribed to the variable electrical conductivity concentration in the water. Similarly, in the positively significant correlation coefficients 37 % of the variability in TS could be due to TDS. In the negatively significant correlation coefficients 20 % variability in TS could be due to Cl, 23 % of the variability in TS could be due to Mg, 50 % of the variability in TS could be due to NO_3-N, 45 % of the variability in TS could be due to TC.

For the sampling point D-3, it was observed that the correlation between TS and other water quality parameters. i. e. TDS, TSS, EC, Ac, DO and DP were positively significant, while it was negatively correlated with Cl, BOD, NO_3-N and TC as shown in Table3. The highest coefficient of correlation between TS and TSS was 0.95 and the coefficient of determination (r^2) value was 0.90, this indicates that 90 % of the variability in TS could be ascribed to the variable TSS concentration in the water. The lowest correlation coefficient 'r' value between TS and Ac was 0.40 and the coefficient of determination (r^2) value was 0.16, this indicated that 16 % of the variability in TS could be ascribed to the variable Acidity concentration in the water. Similarly, in the positively significant correlation coefficient 69 % of the variability in TS could be due to TDS, 24.0% of the variability in TS could be due to EC, 21 % of the variability in TS could be due to DP. In the negatively significant correlation coefficient 42 % of the variability in TS could be due to Cl, 40 % of the variability in TS could be due to NO_3-N, 35 % of the variability in TS could be due to TC.

At sampling point D-4, the observed correlation between TS and other water quality parameters, i. e. TDS, TSS, Ac, DO, and FC were positively significant , while it was negatively correlated with Cl, BOD, COD, NO_3-N, TKN, and TC are as shown in Table 4 .The coefficient of correlation between TS and TSS was 0.90 and the coefficient of determination (r^2) value was 0.81, this indicates that 81 % of the variability in TS could be ascribed to the variable TSS concentration in the water. The lowest correlation coefficient 'r' value between TS and FC was 0.40 and the coefficient of determination (r^2) value was 0.16, this indicated that 16 % of the variability in TS could be ascribed to the variable FC concentration in the water. Similarly, in the positively significant correlation coefficient 72 % of the variability in TS could be due to TDS, 46 % of the variability in TS could be due to Acidity. In the negatively significant correlation coefficients 32 % of the variability in TS colud be due to Cl, 24 % of the variability in TS could be due to COD, 34 % of the variability in TS could be due to NO_3-N, 30 % of the variability in TS could be due to TKN, and 40 % of the variability TS could be due to TC.

For sampling point D-5, the observed correlation coefficient between TS and other water quality parameters, i. e. TDS, TSS, pH, EC, DO were positively significant, while it was negatively correlated with BOD, NO_3-N and TC are as shown in Table 5. The highest coefficient of correlation between TS and TSS was 0.91 and the coefficient of determination (r^2) value was 0.82, this indicates that 82 % of the variability in TS could be ascribed to the variable TSS concentration in the water. The lowest correlation coefficient 'r' value between TS and pH was 0.40 and the coefficient of determination (r^2) value was 0.16, this indicated that 16 % of the variability in TS could be ascribed to the variable pH concentration in the water. Similarly, in the positively significant correlation coefficient 58 % of the variability in TS could be due to TDS, 27 % of the variability in TS could be due to EC. In the negatively significant correlation coefficient 19 % of the variability in TS could be due to NO_3-N, and 46 % of the variability in TS could be due to TC. Due to the discharge of high concentration total solids industrial wastewater near to sampling point D-2, the highest correlation coefficient observed between TS and TSS, TDS, EC etc. was observed at sampling point D-2 compared to other sampling points.

Table 1. Correlation coefficients (r) between the physico-chemical and biological parameters at sampling point D-1 of Karanja Reservoir water

	TS	TDS	TSS	Temp	pH	EC	Ac	Alk	Cl	TH	Ca	Mg	DO	BOD	COD	NH_4N	NO_3N	TKN	OP	DP	TC	FC
TS	1.00																					
TDS	**0.53**	1.00																				
TSS	**0.94**	0.21	1.00																			
Temp	0.16	0.18	0.12	1.00																		
pH	-0.17	0.02	-0.21	-0.18	1.00																	
EC	**0.48**	-0.02	**0.56**	-0.02	-0.08	1.00																
Ac	-0.01	-0.08	0.02	0.14	0.08	-0.36	1.00															
Alk	0.31	-0.05	0.36	-0.19	0.12	0.36	**-0.44**	1.00														
Cl	**-0.43**	0.23	**-0.59**	0.12	0.27	**-0.62**	0.25	**-0.58**	1.00													
TH	**-0.43**	-0.08	**-0.47**	**0.49**	0.11	**-0.44**	0.32	**-0.62**	**0.64**	1.00												
Ca	-0.23	0.09	-0.31	0.51	0.04	-0.38	0.31	**-0.68**	**0.67**	**0.87**	1.00											
Mg	**-0.46**	-0.33	-0.39	0.08	0.14	-0.22	0.14	-0.02	0.07	**0.44**	-0.04	1.00										
DO	0.38	**0.41**	0.31	0.38	0.02	**0.40**	0.13	0.31	**-0.49**	**-0.43**	-0.34	-0.23	1.00									
BOD	-0.33	-0.21	-0.28	-0.33	-0.33	**-0.57**	0.31	**-0.51**	0.19	0.14	0.06	0.18	**-0.48**	1.00								
COD	-0.37	-0.01	**-0.42**	-0.13	**0.67**	-0.11	0.05	0.21	0.16	0.06	-0.11	0.31	0.17	-0.35	1.00							
NH_4-N	**0.65**	0.39	**0.57**	-0.07	-0.19	0.33	-0.03	0.03	-0.27	-0.32	-0.07	**-0.52**	**0.68**	-0.24	-0.09	1.00						
NO_3-N	-0.11	-0.05	-0.11	-0.25	-0.02	-0.17	0.21	-0.29	0.12	-0.02	0.15	-0.29	0.04	0.29	-0.06	0.34	1.00					
TKN	**0.47**	0.06	**0.51**	**-0.43**	-0.19	**0.48**	-0.21	0.19	**-0.49**	**-0.68**	**-0.53**	**-0.43**	**0.49**	-0.05	-0.16	**0.72**	0.35	1.00				
OP	0.08	-0.09	0.11	**-0.48**	-0.38	0.08	-0.19	0.06	-0.31	-0.36	-0.21	-0.36	0.23	0.28	-0.21	**0.54**	**0.61**	**0.62**	1.00			
DP	0.07	-0.10	0.12	**-0.54**	-0.21	0.24	-0.36	0.24	-0.25	-0.38	**-0.44**	0.03	-0.04	0.13	-0.29	0.16	0.06	**0.53**	**0.51**	1.00		
TC	**-0.66**	-0.27	**-0.65**	0.08	0.13	**-0.56**	**0.52**	**-0.51**	**0.46**	**0.64**	**0.48**	**0.44**	**-0.43**	**0.55**	0.23	**-0.55**	0.05	**-0.57**	-0.21	-0.21	1.00	
FC	0.22	-0.17	0.33	-0.12	**-0.54**	0.16	-0.07	-0.09	-0.39	-0.23	-0.11	-0.25	-0.08	0.29	**-0.63**	0.05	0.16	0.18	0.38	0.15	-0.15	1.00

Table 2. Correlation coefficients (r) between the physico-chemical and biological parameters at sampling point-D-2 of Karanja Reservoir water

	TS	**TDS**	**TSS**	**Temp**	**pH**	**EC**	**Ac**	**Alk**	**Cl**	**TH**	**Ca**	**Mg**	**DO**	**BOD**	**COD**	**NH_4N**	**NO_3N**	**TKN**	**OP**	**DP**	**TC**	**FC**
TS	1.00																					
TDS	**0.61**	1.00																				
TSS	**0.97**	**0.44**	1.00																			
Temp	0.03	-0.25	0.11	1.00																		
pH	0.05	0.01	0.06	-0.04	1.00																	
EC	**0.41**	0.13	**0.45**	-0.16	0.16	1.00																
Ac	0.13	0.04	0.15	0.27	0.16	-0.02	1.00															
Alk	-0.11	-0.12	-0.09	0.15	0.21	0.10	**0.48**	1.00														
Cl	**-0.45**	**-0.41**	-0.35	**0.49**	-0.29	-0.38	0.08	0.05	1.00													
TH	-0.39	-0.21	-0.35	**0.49**	-0.35	-0.48	-0.03	0.28	**0.43**	1.00												
Ca	-0.10	0.05	-0.14	0.23	-0.24	-0.25	-0.06	**-0.41**	0.08	**0.77**	1.00											
Mg	**-0.48**	-0.37	-0.37	**0.45**	-0.22	**-0.40**	0.05	0.10	**0.55**	**0.54**	-0.11	1.00										
DO	0.33	0.39	0.31	0.32	**0.59**	**0.60**	0.17	0.26	**-0.45**	**-0.69**	-0.35	**-0.59**	1.00									
BOD	-0.27	-0.06	-0.36	-0.31	-0.22	**-0.43**	-0.16	0.10	-0.04	0.21	0.03	0.30	**-0.53**	1.00								
COD	-0.33	-0.19	-0.32	-0.16	-0.31	**-0.40**	**-0.47**	0.01	0.26	0.28	0.09	0.32	-0.35	0.36	1.00							
NH_4-N	-0.22	0.01	-0.16	-0.17	0.03	0.13	-0.01	0.03	0.30	0.03	-0.20	0.32	-0.14	0.20	-0.04	1.00						
NO_3-N	-0.71	**-0.56**	**-0.65**	0.31	-0.11	**-0.44**	-0.21	0.03	**0.52**	**0.67**	0.30	**0.65**	**-0.61**	**0.43**	**0.48**	0.23	1.00					
TKN	-0.33	-0.11	-0.35	0.16	0.04	-0.15	0.06	0.05	0.34	0.34	0.22	0.27	-0.19	0.30	0.02	**0.62**	**0.53**	1.00				
OP	0.25	0.25	0.18	-0.33	0.19	0.19	0.22	**0.50**	-0.37	**-0.47**	-0.28	-0.35	0.31	0.11	-0.11	0.25	**-0.40**	0.10	1.00			
DP	0.39	**0.53**	0.33	**-0.50**	0.29	**0.44**	0.19	0.23	-0.39	**-0.57**	-0.36	**-0.40**	**0.46**	-0.11	**-0.42**	0.23	**-0.61**	-0.29	**0.58**	1.00		
TC	**-0.67**	**-0.55**	**-0.63**	0.24	-0.21	-0.23	-0.03	0.00	0.34	**0.50**	0.31	**0.40**	**-0.53**	**0.50**	0.13	0.22	**0.77**	**0.64**	-0.28	**-0.55**	1.00	
FC	0.20	0.29	0.13	0.07	0.02	0.26	0.30	0.04	-0.14	0.03	0.35	**-0.43**	0.18	-0.26	**-0.61**	0.17	**-0.42**	-0.20	0.12	0.38	-0.28	1.00

Table3. Correlation coefficients (r) between the physico-chemical and biological parameters at sampling point D-3 of Karanja reservoir water

	TS	TDS	TSS	Temp	pH	EC	Ac	Alk	Cl	TH	Ca	Mg	DO	BOD	COD	NH_4N	NO_3N	TKN	OP	DP	TC	FC
TS	1.00																					
TDS	**0.83**	1.00																				
TSS	**0.95**	**0.61**	1.00																			
Temp	0.14	0.06	0.17	1.00																		
pH	0.22	0.19	0.20	0.08	1.00																	
EC	**0.49**	**0.46**	**0.43**	0.14	0.25	1.00																
Ac	**0.40**	**0.59**	0.24	0.25	-0.10	0.06	1.00															
Alk	0.37	**0.56**	0.20	0.03	-0.13	-0.04	**0.85**	1.00														
Cl	**-0.65**	**-0.52**	**-0.63**	0.08	-0.05	**-0.45**	-0.13	-0.18	1.00													
TH	-0.12	-0.10	-0.12	**0.63**	-0.01	0.04	0.06	-0.07	0.12	1.00												
Ca	0.05	-0.12	0.14	**0.46**	0.05	0.25	-0.23	**-0.40**	-0.03	**0.78**	1.00											
Mg	-0.36	-0.16	**-0.42**	0.37	-0.14	-0.25	0.22	0.29	0.21	**0.49**	-0.06	1.00										
DO	0.33	**0.49**	0.33	0.35	0.39	0.35	0.05	0.15	-0.50	-0.36	-0.06	**-0.45**	1.00									
BOD	-0.33	-0.23	-0.38	-0.16	-0.29	-0.36	0.06	0.19	0.10	0.28	0.01	0.38	**-0.55**	1.00								
COD	-0.04	-0.17	0.05	0.37	-0.20	0.00	-0.22	-0.03	0.13	**0.44**	**0.40**	0.21	0.04	0.33	1.00							
NH_4-N	0.00	-0.02	0.01	**-0.49**	-0.29	0.06	-0.20	-0.14	-0.11	-0.31	0.01	**-0.50**	0.21	0.09	-0.16	1.00						
NO_3-N	**-0.64**	**-0.73**	**-0.50**	0.00	-0.10	-0.22	**-0.66**	**-0.55**	0.36	0.34	0.36	0.20	**-0.44**	0.36	0.38	-0.07	1.00					
TKN	-0.30	-0.36	-0.22	0.13	-0.37	-0.17	0.08	-0.05	0.14	0.31	0.29	0.07	-0.22	**0.51**	0.07	**0.41**	0.20	1.00				
OP	0.02	0.00	0.02	0.17	-0.28	0.14	-0.22	-0.25	-0.30	-0.20	-0.20	-0.05	0.01	-0.07	-0.06	0.10	-0.07	-0.06	1.00			
DP	**0.46**	**0.41**	**0.41**	**-0.45**	0.05	0.35	0.13	0.20	**-0.45**	**-0.57**	-0.36	**-0.41**	**0.50**	-0.21	-0.37	**0.42**	-0.31	0.00	0.07	1.00		
TC	**-0.59**	**-0.46**	**-0.58**	0.24	-0.25	-0.06	0.03	-0.02	**0.50**	**0.50**	0.24	**0.44**	**-0.60**	**0.52**	0.11	-0.01	0.35	**0.61**	-0.10	-0.36	1.00	
FC	0.29	0.03	**0.40**	-0.21	-0.02	0.21	-0.39	**-0.50**	**-0.44**	-0.21	0.25	**-0.44**	0.26	-0.18	-0.20	0.32	0.38	-0.05	0.08	0.26	**-0.42**	1.00

Table 4. Correlation coefficients (r) between the physico-chemical and biological parameters at sampling point D-4 of Karanja reservoir water

	TS	**TDS**	**TSS**	**Temp**	**pH**	**EC**	**Ac**	**Alk**	**Cl**	**TH**	**Ca**	**Mg**	**DO**	**BOD**	**COD**	**NH_4N**	**NO_3N**	**TKN**	**OP**	**DP**	**TC**	**FC**
TS	1.00																					
TDS	**0.85**	1.00																				
TSS	**0.90**	**0.56**	1.00																			
Temp	0.20	0.22	0.17	1.00																		
pH	0.06	0.33	-0.20	-0.17	1.00																	
EC	-0.21	-0.30	-0.04	-0.22	**-0.55**	1.00																
Ac	**0.68**	**0.75**	**0.45**	**0.47**	0.30	-0.38	1.00															
Alk	0.26	0.38	0.05	-0.04	**0.41**	-0.13	**0.52**	1.00														
Cl	**-0.57**	-0.38	**-0.57**	0.15	0.07	-0.19	-0.28	-0.21	1.00													
TH	0.03	0.21	-0.08	**0.70**	0.00	-0.02	0.30	-0.14	0.03	1.00												
Ca	0.15	0.21	0.12	**0.53**	-0.19	0.05	0.19	-0.30	-0.05	**0.81**	1.00											
Mg	-0.15	0.03	-0.29	0.33	0.32	-0.14	0.21	0.26	0.10	0.33	-0.28	1.00										
DO	0.33	0.26	0.36	0.37	0.32	-0.12	**0.42**	0.07	-0.31	0.09	0.31	-0.34	1.00									
BOD	-0.31	-0.22	-0.37	**-0.51**	0.02	0.27	**-0.59**	-0.18	0.04	-0.20	-0.30	0.12	**-0.61**	1.00								
COD	**-0.49**	**-0.59**	-0.35	-0.22	-0.21	0.10	**-0.67**	-0.23	0.10	0.00	-0.09	0.11	**-0.51**	**0.56**	1.00							
NH_4-N	-0.31	-0.27	-0.20	-0.32	-0.23	**0.48**	-0.36	-0.24	0.30	-0.10	-0.07	-0.08	-0.08	**0.46**	0.18	1.00						
NO_3-N	**-0.59**	**-0.55**	**-0.49**	0.11	-0.34	**0.41**	**-0.47**	**-0.48**	0.26	**0.46**	**0.49**	-0.07	-0.35	**0.42**	**0.46**	0.30	1.00					
TKN	**-0.55**	**-0.46**	**-0.49**	-0.01	0.01	0.03	-0.26	-0.20	**0.44**	-0.03	-0.02	-0.05	**-0.52**	**0.48**	0.17	0.35	0.39	1.00				
OP	0.25	0.25	0.10	**-0.49**	0.10	-0.18	0.03	0.14	-0.24	-0.31	-0.26	-0.10	0.17	0.25	0.15	0.06	-0.17	0.08	1.00			
DP	0.20	0.21	0.17	**-0.67**	0.11	0.13	-0.09	0.13	-0.18	**-0.71**	**-0.60**	-0.18	0.27	0.04	-0.29	0.21	**-0.55**	-0.13	**0.45**	1.00		
TC	**-0.63**	**-0.45**	**-0.62**	0.27	-0.11	0.39	-0.19	-0.10	0.32	**0.47**	0.23	0.37	**-0.60**	**0.47**	0.18	0.33	**0.70**	**0.53**	-0.32	**-0.49**	1.00	
FC	**0.40**	0.36	0.39	-0.32	-0.24	0.23	-0.05	-0.22	-0.26	-0.10	0.25	**-0.57**	**0.54**	-0.05	-0.18	0.29	0.03	-0.20	0.38	**0.41**	-0.34	1.00

Table 5. Correlation coefficients (r) between the physico-chemical and biological parameters at sampling point D-5 of Karanja reservoir water

	TS	**TDS**	**TSS**	**Temp**	**pH**	**EC**	**Ac**	**Alk**	**Cl**	**TH**	**Ca**	**Mg**	**DO**	**BOD**	**COD**	**NH_4N**	**NO_3N**	**TKN**	**OP**	**DP**	**TC**	**FC**
TS	1.00																					
TDS	**0.76**	1.00																				
TSS	**0.91**	**0.45**	1.00																			
Temp	0.16	0.23	0.11	1.00																		
pH	**0.40**	0.36	0.35	-0.11	1.00																	
EC	**0.52**	0.34	**0.49**	0.01	0.30	1.00																
Ac	-0.01	0.04	-0.04	0.37	0.09	0.09	1.00															
Alk	0.30	0.14	0.32	-0.07	**0.40**	0.37	**0.40**	1.00														
Cl	-0.27	-0.17	-0.23	0.09	-0.12	**-0.58**	0.03	**-0.42**	1.00													
TH	-0.30	-0.17	-0.30	**0.57**	-0.12	-0.09	0.20	-034	**0.47**	1.00												
Ca	-0.17	-0.04	-0.20	**0.44**	-0.04	-0.15	0.04	**-0.42**	**0.59**	**0.89**	1.00											
Mg	-0.31	-0.30	-0.24	0.33	-0.19	0.10	0.35	0.14	-0.20	0.34	-0.13	1.00										
DO	0.36	0.35	0.25	0.33	**0.58**	0.31	0.00	0.20	-0.02	-0.25	-0.14	-0.25	1.00									
BOD	-0.26	**-0.46**	-0.23	-0.06	-0.25	-0.24	0.27	0.17	-0.05	0.13	-0.07	**0.41**	**-0.40**	1.00								
COD	-0.22	-0.16	-0.17	0.21	**0.47**	-0.17	0.10	0.02	0.10	0.34	0.20	0.32	0.09	0.35	1.00							
NH_4-N	0.20	0.21	0.17	-0.15	0.19	0.06	-0.15	-0.24	0.32	0.03	0.18	-0.31	**0.48**	-0.23	0.17	1.00						
NO_3-N	**-0.44**	-0.21	**-0.46**	0.01	-0.19	-0.30	0.11	**-0.44**	**0.71**	**0.58**	**0.70**	-0.18	-0.15	0.07	0.03	0.23	1.00					
TKN	-0.32	-0.20	-0.32	0.01	-0.24	0.29	0.35	-0.16	0.14	0.02	-0.09	0.24	0.06	**0.55**	0.21	0.08	0.13	1.00				
OP	0.07	0.16	-0.05	**-0.51**	-0.15	-0.17	-0.21	-0.09	-0.16	-0.35	-0.20	-0.35	0.27	0.04	-0.16	0.19	-0.03	0.31	1.00			
DP	0.03	-0.06	0.01	**-0.67**	-0.13	0.07	-0.38	0.11	-0.27	**-0.49**	**-0.41**	-0.22	0.17	0.08	**-0.43**	0.01	-0.29	-0.06	**0.60**	1.00		
TC	**-0.68**	**-0.42**	**-0.67**	0.10	-0.28	-0.19	**0.46**	-0.07	0.37	**0.52**	0.32	**0.45**	-0.33	**0.61**	0.13	-0.12	**0.45**	**0.52**	-0.19	-0.17	1.00	
FC	0.11	0.07	0.11	-0.26	-0.16	-0.02	-0.39	-0.36	0.01	-0.10	0.20	**-0.63**	0.05	-0.22	-0.35	0.06	0.14	-0.24	0.32	0.20	-0.35	1.00

V. CONCLUSION

The present study clearly shows that effect of effluent disposal on this reservoir, correlation study among physico chemical and Biological characteristics of reservoir where carried out. It is observed that the distribution of TDS, TSS, EC, Cl, TH, Mg, DO, BOD, COD, NH_4-N, TKN, OP, DP TC and acidity were significantly correlated ($r > 0.4$) with total solids (TS) in most of the sampling points. Hence, in the present study the correlation between total solids with other variables is discussed in detail. This method helpful for public to understand the quality of water as well as being useful tool in many ways in the field of water quality management. The present study further suggests that regular monitoring should be done to identify the pollution source.

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