THE STUDY OFCONTAMINATED SURFACE WATER UNDER VARIOUS PARAMETERS WITH GRAPHICAL REPRESENTATION AND INTERPRETATIONS IN THE AREAS OF MEDAK-DIST,TELANGANA STATE

[1]Hashmath Ali Khan, [2]DrKhajaZaheeruddin

[1]Research Scholar, Mewar University,[2]Research Supervisor, Mewar University

Mewar University,Rajasthan,India

Abstract: *A study was conducted to analyze the of pollution load by collecting samples from both surface water and ground wateratKazipally-IDA(SamlePoint-1), Gaddapotheram-IDA(Sample Point-2), and Bollaram-IDA(Sample Point-3) during the rainy season. The aim was to assess the worth and appropriateness of these water irrigation,drinking and other uses by local citizens. Samples wereanalyzed for various physical and chemical parameters like "pH, E.C, T.D.S, Nitrates, Phosphates,Flourides, Sodium, Potassium, Calcium, and magnesium". All the results were compared with {US-EPA} and {WHO-standards} and it was found that surface water and ground water are highly-polluted and they are neither fit for irrigation nor safe for drinking purposes.*

IndexTerms: *pH,EC,TDS,Irrigation,Potability,Ancillary.*

INTRODUCTION :

Patancheruwas treated as industrial estate since [1975] as part of Govt's initiative step to bring in more industries and to make industrialised to remove the backward areas in the State of A.p,India.ThusMedak has been transformed into Industrial-belt area. Industrial effluents are discharged into water bodies containing toxic chemicals from various industries. The "toxicity of various pollutants contaminates the water bodies" and they become poisonous to the aquatic-life. Many hazardous chemicals are releasing by industries only, but not produced in thenature. These chemicals are stable and there break down by the existing common effluent treatment-plants is not possible. This problem is aggravated by "lack of awareness", lack of waste-water treatment facilities, lack of financial resources and insufficient environmental laws.

Present studies were carried out at Kazipally-IDA(sample Point-1), Gaddapotheram-IDA(sample Point-2),Bolaram-IDA(sample Point-3).The industries of Kazipally-IDA(sample Point-1), Gaddapotheram-IDA(sample Point-2) are discharging their wastes into Kazipally lake. From Kazipally lake, the water moves towardsGandigudem lake and polluting the water in the natural bodies such as Kistareddy pet-lake, Asanikunta-pond, ,palma-vagu, Pedda-vagu Stream all the way up to river Manjera.pH was measured using a Systronics-pH digital-meter and by Elico-p H, Electrical conductivity by conductivity meter and T.D.S by T.D.S-meter-308. Na and K were determined by using flame-photometer. Ca- Mg and total hardness by volumetrictitri-metric method.

RESULTS :

Table 1 :SURFACE WATER MAJOR ION ANALYSIS OF"POST MONSOON" 2015 (October,November as per Meteorological department India)

s/No	SAMPLE FROM LAKE	P^H	EC in ms/cm	TDS in Mg/L	HCO_3^- in meq/L	SO_4^{-2} in meq/L	Na^+ in meq/L	K^+ in meq/L	Mg^{+2} in meq/L	Ca^{+2} in meq/L
1	Khazipally Tank(S1)	7.41	24	12000	14.6	78.9	176	16.1	21.8	49.6
2	Gandigudem(S2)	7.48	14.5	7250	13.2	74.2	152	14.3	27.2	44.3
3	Asanikunta(S3)	7.54	26.3	13150	14.9	62.6	168	14.7	36.2	46.7
4	Kistareddy-Pet(S4)	6.4	14.5	7250	10.6	68.3	173	16.6	24.6	34.8
5	Palma-vagu(S5)	7.2	20.6	10300	12.8	70.2	154	13.4	30.1	41.4
6	Pedda-Vagu(S6)	7.32	15.9	7950	13.0	72.3	193	13.6	26.5	42.6
7	Nakka-Vagu(S7)	7.34	26.3	13150	13.0	76.7	181	14.3	33.1	41.9

Table 2 :SURFACE WATER MAJOR ION ANALYSIS OF PRE MONSOON (march ,april ,may as per Meteorological department India) 2015

s/No	SAMPLE	P^H	EC in ms/cm	TDS in Mg/L	HCO_3^- in meq/L	SO_4^{-2} in meq/L	Na^+ in meq/L	K^+ in meq/L	Mg^{+2} in meq/L	Ca^{+2} in meq/L
1	Khazipally Tank(S1)	7.62	25	12500	15.8	86.4	188	18.2	26.3	60.6
2	Gandigudem(S2)	7.64	19.5	9750	14.3	85.4	164	16.6	32.3	55.8
3	Asanikunta(S3)	7.8	27.2	13600	16.2	79.7	173	17.7	41.4	56.2
4	Kistareddy Pet(S4)	7.1	21.5	10750	12.2	80.2	187	15.6	31.7	46.5
5	Palmavagu(S5)	7.3	22.8	11420	14.6	83.5	170	14.4	36.3	52.6
6	PeddaVagu(S6)	7.5	20.9	10450	15.4	81.3	196	14.5	29.4	54.5
7	NakkaVagu(S7)	7.42	28.3	14180	15.2	84.4	190	15.6	38.6	54.4

Table 3 :SURFACE WATER MAJOR ION ANALYSIS OF POST MONSOON (October,Novemberas per Meteorological department India) 2016

s/No	SAMPLE FROM LAKE	P^H	EC in ms/cm	TDS in Mg/L	HCO_3^- in meq/L	SO_4^{-2} in meq/L	Na^+ in meq/L	K^+ in meq/L	Mg^{+2} in meq/L	Ca^{+2} in meq/L
1	Khazipally Tank(S1)	7.51	22.5	11250	15.2	79.4	189	17.2	23.5	51.5
2	Gandigudem(S2)	7.52	14.3	7000	14.2	76.4	166	14.6	29.4	52.4
3	Asanikunta(S3)	7.63	23.7	11870	15.4	64.6	174	14.8	38.5	50.6
4	Kistareddy Pet(S4)	6.6	14.6	7000	11.4	69.0	184	17.5	28.6	38.4
5	Palmavagu(S5)	7.46	21.0	10540	13.4	72.4	164	14.4	34.5	46.5
6	PeddaVagu(S6)	7.52	16.0	8000	13.9	76.3	200	14.0	28.5	46.5
7	NakkaVagu(S7)	7.64	27	13500	14.6	78.4	195	14.9	35.4	43.0

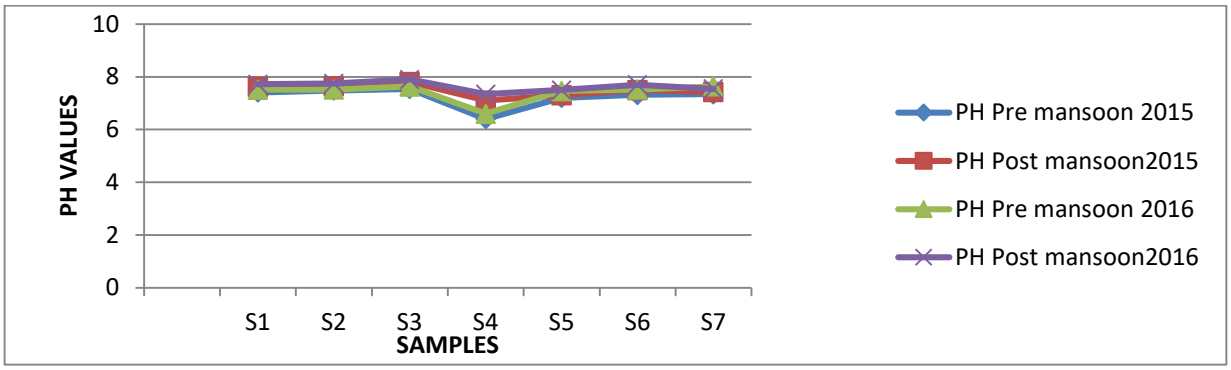
Table 4 :SURFACE WATER MAJOR ION ANALYSIS OF PRE MONSOON (march ,april ,may as per Meteorological department India) 2016

s/No	SAMPLE	PH	EC in ms/cm	TDS in Mg/L	HCO_3^- in meq/L	SO_4^{-2} in meq/L	Na^+ in meq/L	K^+ in meq/L	Mg^{+2} in meq/L	Ca^{+2} in meq/L
1	Khazipally Tank(S1)	7.72	25.7	12850	15.8	88.5	200	19.5	30.0	62.5
2	Gandigudem(S2)	7.75	20.9	10450	14.3	86.5	175	16.0	35.5	60.5
3	Asanikunta(S3)	7.9	27.7	13850	16.2	80.4	185	17.5	45.5	64.0
4	Kistareddy Pet(S4)	7.34	19.9	9950	12.2	82.6	196	18.2	38.4	56.5
5	Palmavagu(S5)	7.5	24	12000	14.6	84.5	188	16.3	40.0	60.0
6	PeddaVagu(S6)	7.7	21	10500	15.4	84.5	200	16.0	35.0	60.4
7	NakkaVagu(S7)	7.54	29.2	14600	15.2	88.5	200	17.2	40.0	58.6

DISCUSSION AND GRAPHICAL REPRESENTATIONS :

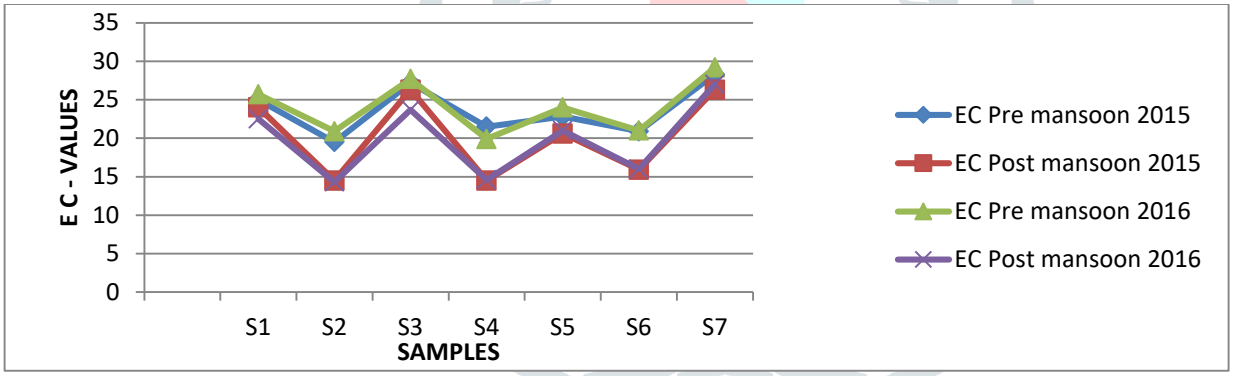
The pH is an index to donate acidic , basic nature of water or any solution. It is the negative logarithm of concentration of H^+ ion.The pH of the surface water of water bodies and ground water found to be in the range of {6.4 to 7.9}. The pH of all the of surface water are within the permissible limits of (US-EPA) and (WHO

standards) {6.0-8.5}.Sample (s4) is having pH less than 7 rest of the samples are having pH more than 7 .The graphical representation is shown below.

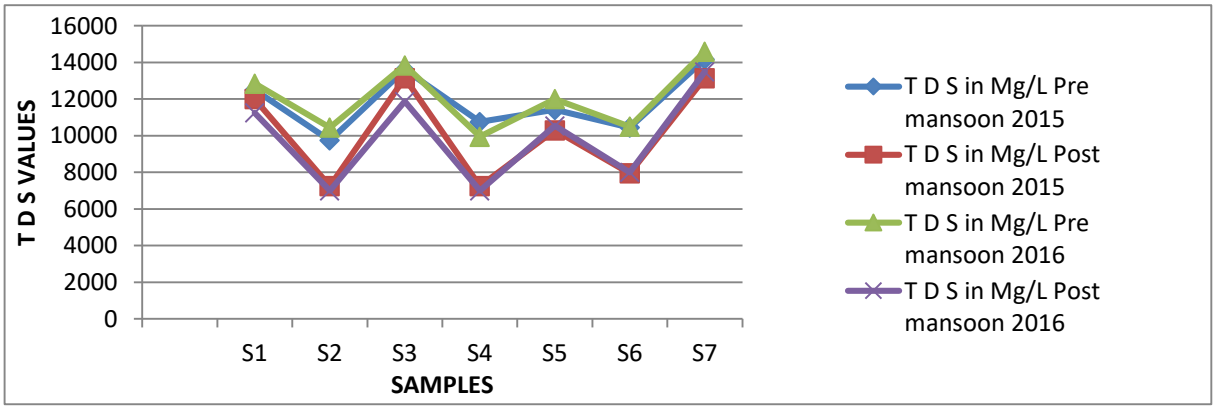


Electrical-conductivity helps to is a measure capacity of water to carry an electric current. This property is related to the total concentration of ionized substances in water .Conductivity of water is a measure of total dissolved solids, is one of the most important factor of water quality, which effects the water intake of the crops.The electrical-conductivity of water at 25o C must be less than 1.5 mS/cm as per WHOthen water is considered to be safe and if it is more than 1.5 mS/cm is not safe for harvests it may create salinity/alkalinity problems in the soil in due course. However, the conductivity of all the samples were found to be is in the range of 14ms/cm to 30ms/cm thusthe water is considered to be dangerous for crops.

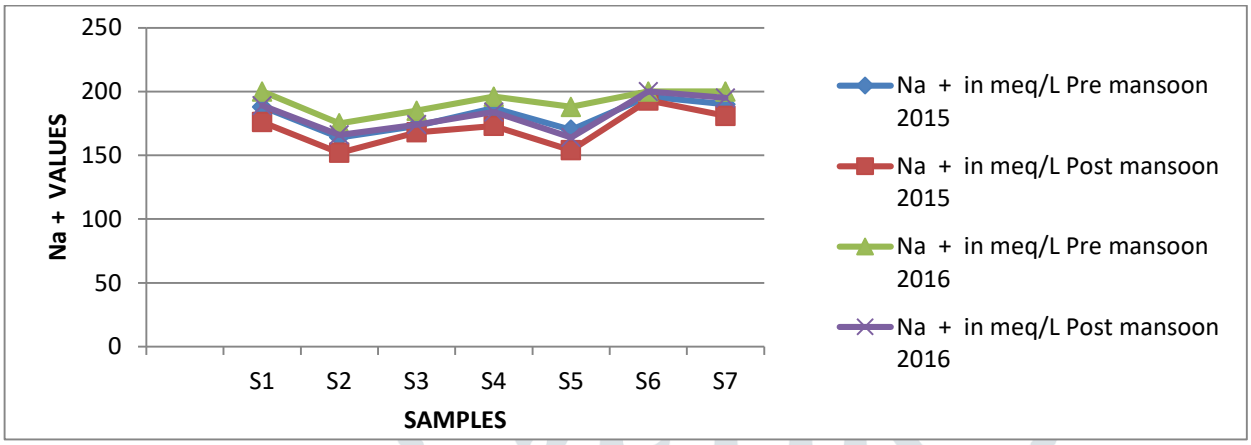
The Electrical-conductivity for the samples S1,S3,S5,S7 is high that is there may be direct discharge of chemicals in to the streams . The graphical representation is shown below .



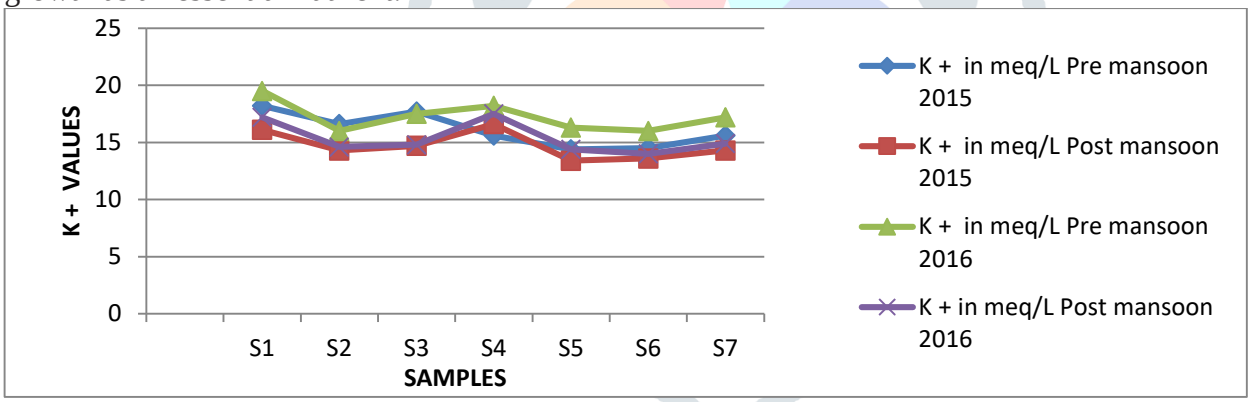
The total dissolved solids is the measure of complete inorganic, organic substances present in a liquid .The presence of TDS in water leads to pollution in lakes, steams rivers etc.According to WHO, TDS of drinking water should not be more than 500 ppm . The samples under study has high TDS values having range from 7000 mg/l to 15000 mg/lit .Thus this water is more dangerous for drinking .



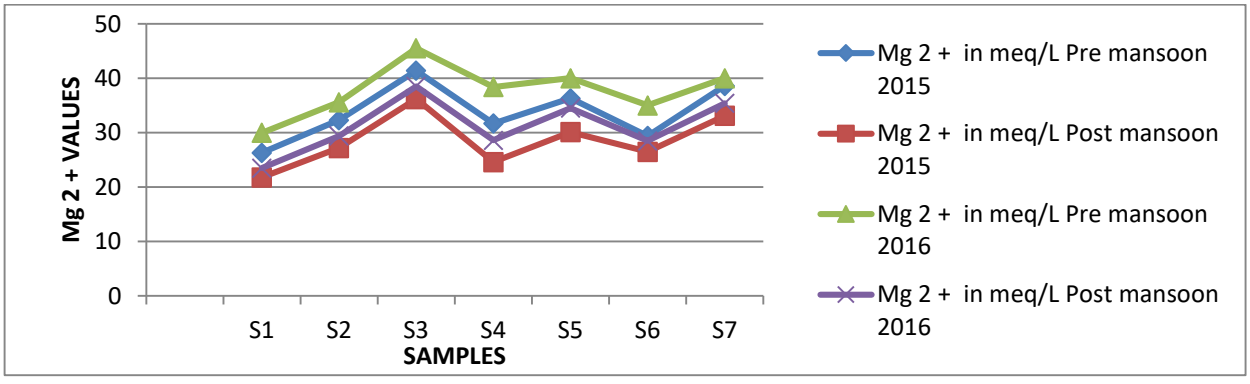
Na is found to be in the range of {152-200 meq/L} for lakes which is very high. Uptoenough concentration of Na there is no harmfuleffect, but high concentration mayaffect the soil structure as well as permeability resulting in alkaline salts and becomes toxic to plants . For surface water or for underground water the permissible limit is 20 mg/l and as per EPA it is 30-60 mg/l



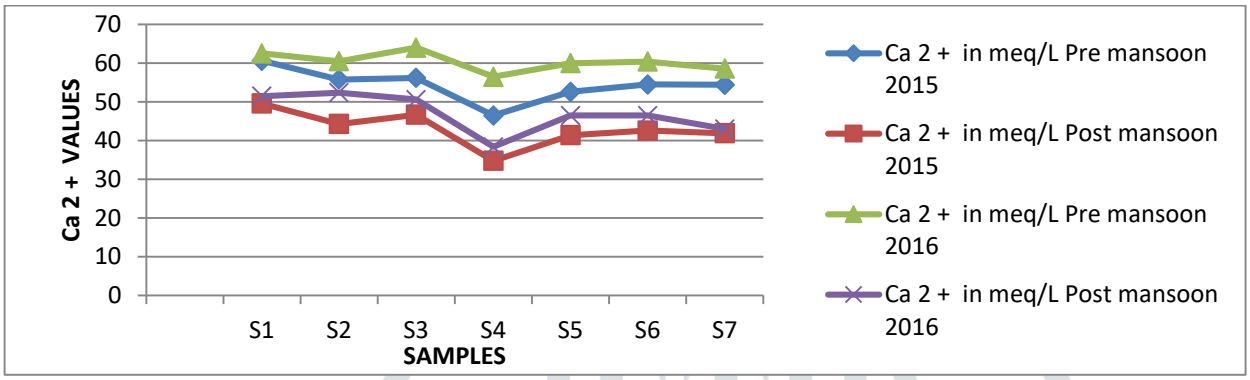
K is found to in the range from {13.4-19.5 meq/ L} for lakes. Potassium is an essential element for human health that is for clotting of blood thus it does not have any toxic effects on human health but it helps in plant growth as an essential nutrient.



Magnesium is found to be in the range of { 21.8-41.4 meq/L} for lakes. Magnesium is regarded as non-toxic to human health but the samples S3 ,S5, S7 are having more concentration than other asmples.



Ca is found to be in the range from {34.8-64.0 meq/L} for lakes and up to 200mg\l is a allowable limit ..Cahas nonhazardous effect on human health, in fact it is one of the most important nutrients required by the organism. Calciumhelps in maintaining the plant cell and soil.How ever calcium is found in the samples S1,S3,S5 and S6



CONCLUSIONS:

The studyshows that the chemicalscoming from the industries have huge impact on the water. Although, the some values in some cases were lower than the allowable limits, the continuous discharge of the effluents in the lakes may result in severe accumulation of the contaminants, which inturneffect the lives of the people. The following conclusions may be arrived at, based on the study.

- The industrial-effluents had severely polluted the lakes especially Kazipally lake,Gandigudem andAsanikuntapond.
- The ground water is not fit for drinking in many areas around the lakes it may be due to penetration of polluted water in ground water..
- The surface and ground water is not safe for irrigation
- The lakes are degraded* in its quality due to excessive input of industrial effluent from the industries.
- The lakes had turned to "Eutrophic".

The following necessarysteps should be taken for the treatment of industrial effluents before going into water bodies

- Govt. has to take necessary steps to monitor & treat the industrial effluents regularly.
- Kazipallylake(S1), Asanikunta-pond(S3), kistareddy pet-lake(S4), which are identified as highly effected by toxic-industrial-discharges and for which remedial steps should be taken.
- All the contaminated lakes must be regularly checked.

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